TECHNOLOGY DEPARTMENT

32nd Year

SEPTEMBER, 1948

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RUBBER AGE

Agerite Stalite

AGERITE STALITE is the newest member of the AGERITE family

For a considerable time after its development all of the output was used in the manufacture of synthetic rubber.

Production facilities have been increased so that it is now readily available for general use.

It is a mixture of Mono and Di-heptyl diphenylamines, and is a clear reddish-brown liquid.

STALITE is a very good general-purpose antioxidant.

It discolors much less than other general-purpose antioxidants, and does not migrate or bleed. It is therefore well suited for carcass stocks of tires, mechanicals and footwear—even for tires with white sidewalls and footwear with colored trim.

R. T. VANDERBILT CO. Inc.

230 PARK AVENUE, NEW YORK 17, N. Y.

TEST RECIPES

	A	B
PALE CREPE	100.0	100.0
SULFUR	2.0	2.0
ZINC OXIDE	5.0	5.0
THIONEX	0.2	0.125
BARAK	—	0.5

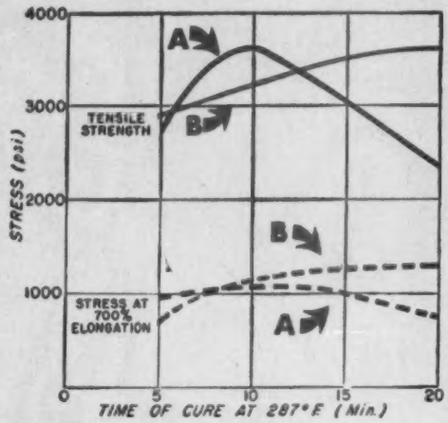

FIG. 1

TEST RECIPE

SMOKED SHEETS	100.0
ZINC OXIDE	5.0
SULFUR	3.0
EPC BLACK	25.0
THIONEX	0.15
BARAK	1.0

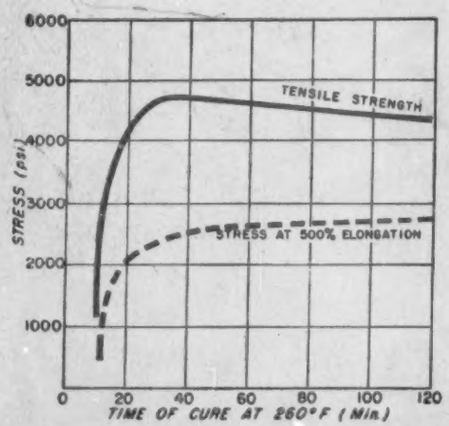

FIG. 2

Prevent "peaky" cures with DU PONT BARAK

An Accelerator Activator

Used with thiuram, thiazole or thiazoline accelerators, Barak effectively extends the curing range of rubber stocks. Even with accelerators having exceptionally "peaky" curing characteristics, the effect of Barak is outstanding.

In Fig. 1, the value of Barak in extending the curing of a Thionex-accelerated gum stock is demonstrated. Judged by either tensile strength or modulus, the stock containing Barak has a much longer curing range . . . displays less tendency to revert.

In Fig. 2, the effectiveness of Barak in a Thionex-accelerated stock containing carbon black is shown. Optimum tensile strength was obtained in 30 minutes, yet even after 120 minutes there was no change in tensile strength or modulus.

In addition, the use of even small percentages of Barak allows a substantial reduction in the quantity of stearic acid necessary in the compound. And, too, reduced quantities of accelerator are required since Barak is an effective accelerator activator. Our technical representatives will be pleased to advise you on the use of Barak in your stocks. Or write: E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division, Wilmington 98, Delaware.

Tune in to Du Pont "Cavalcade of America," Monday Nights—NBC Coast to Coast

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. September, 1948. Vol. 63, No. 6.

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DETROIT

TWO NEW HYCAR AMERICAN RUBBERS

Hycar OR-25 EP *(Easy Processing)*
Hycar OR-25 NS *(Non-Staining)*

HERE are two new American rubbers, both with superior processing characteristics. Hycar NS and Hycar EP differ only in that a special anti-oxidant has been used in the NS, making it non-staining and non-discoloring. This is an outstanding quality, particularly desirable in the fabrication of light colored products. The new Hycar rubbers have all these advantages over the regular process Hycar OR-25:

1. They band on the processing mill speedily—cut mill mixing time.
2. Better extrusion characteristics—less nerve and less heat build-up.
3. Excellent high temperature mixing.
4. Better fusion and mold flow characteristics.
5. Increased building tack for laminated products, such as frictioned stocks and calendered sheeting.

Both rubbers retain those properties which make Hycar American rubbers so usable for so many products . . . permanent resiliency and superior resistance to oil, abrasion, and aging. Ask your supplier for parts made from Hycar. Or write to Dept. HB-9, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

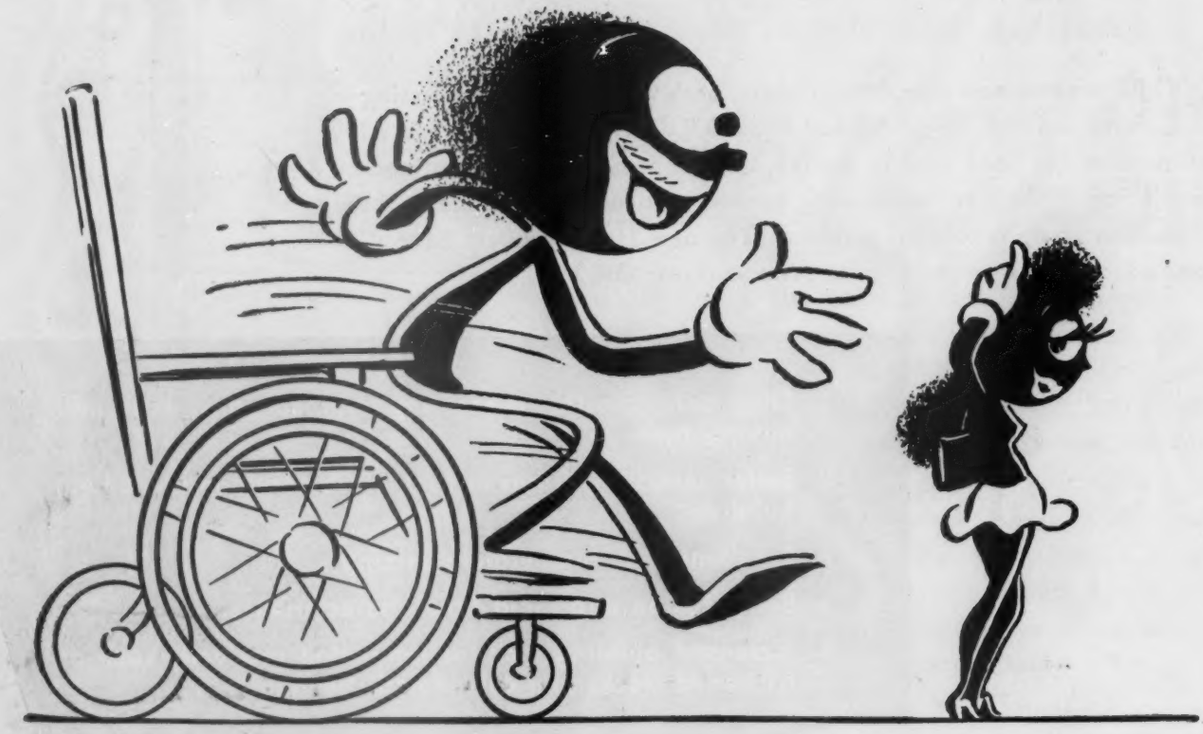
Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Fast Cure...

WITH PHILBLACK A!



You don't believe in miracles? Then you should see Philblack A in action! Fast cure with less acceleration is only one of the near-miracles that this HMF type black can perform for you. It will speed up processing time materially (usually 10 to 25%) and help greatly in obtaining smooth extrusions.

And what good finished products you get when this wonder-working black goes to work for you. Resilience?... Good! Pliancy? ... Wonderful! Abrasion resistance?... Excellent! In addition, you benefit from low hysteresis when you use this HMF type black. Try Philblack A, today.

PHILLIPS PETROLEUM COMPANY

Rubber Chemicals Division

EVANS SAVINGS AND LOAN BUILDING · AKRON 8, OHIO

When this waxer smacks the wall...

GEON leaves no mark at all! You are looking at what is unquestionably the most polite floor conditioner you ever met. Kent Electric Company makes it for scrubbing, wax-spreading and polishing —and they've eliminated what everybody hates most in a cleaner—the denting, marking and scraping of baseboards and furniture.

How? They put on a bumper guard made from Geon polyvinyl resin, thereby taking advantage of its resilience, flexibility and non-marking qualities. They called for the other combination of qualities Geon can produce, too—resistance to age, wear and weather, resistance to heat or cold, ability to combine great strength with either rigidity or suppleness.

Wherever Geon does a job it does it well—and often at less cost than other versatile materials. It can be extruded or cast into sheets, it serves as an impregnant or coating for paper or textiles, it can be molded, it takes to color like you take to your hat. We're really telling you about this floor conditioner so you'll put your own thinking cap on. What do you make that Geon will make better for you?

We make no finished products of Geon or any of our other B. F. Goodrich Chemical Company raw materials. However, we are interested in helping with special problems or applications. For information, please write to B. F. Goodrich Chemical Company, Dept. R-9, Rose Building, Cleveland, Ohio. In Canada: Kitchener, Ontario.

Polisher by Kent Electric Corp., Rome, N.Y.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

Good-rite
VULTROL
for use in American rubber compounding
to prevent scorching, and for recovering
scorched stocks
GOOD-RITE AND VULTROL REG. T. M. U. S. PAT. OFF.

For technical data please write Dept. CB-9

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals

ROLLS

"CUSTOM-PRODUCED"

FOR SPECIFIC JOBS

In supplying the needs of the rubber industry for the past century, Farrel-Birmingham has learned the precise requirements of each type of rubber processing roll . . . the exact qualities each roll needs to best do its job and stand up under the punishment it will receive.

The application of this experience in roll manufacture in a plant where exceptional facilities have been developed, and where only the highest grade materials are used, adds up to the reason for the built-in competence and extra service life that rubber manufacturers have come to expect from F-B rolls.

Production procedures that safeguard F-B roll quality include: correct design by experienced engineers . . . close control throughout each step of manufacture, from metallurgical analysis of raw materials and prescription of the metal mixture, to final inspection of the finished roll . . . a method of casting chilled iron rolls which assures a hard working surface of correct and even depth and preserves the strength of the gray iron structure of the roll body . . careful machining by the most advanced methods . . . grinding bodies and journals to required accuracy and finish, with straight, crowned or concave face.

When you need rolls or other rubber processing equipment for specific applications, call on Farrel-Birmingham.

FB-348

FARREL-BIRMINGHAM CO., Inc.
ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Chicago, Los Angeles, Tulsa, Houston

Farrel-Birmingham

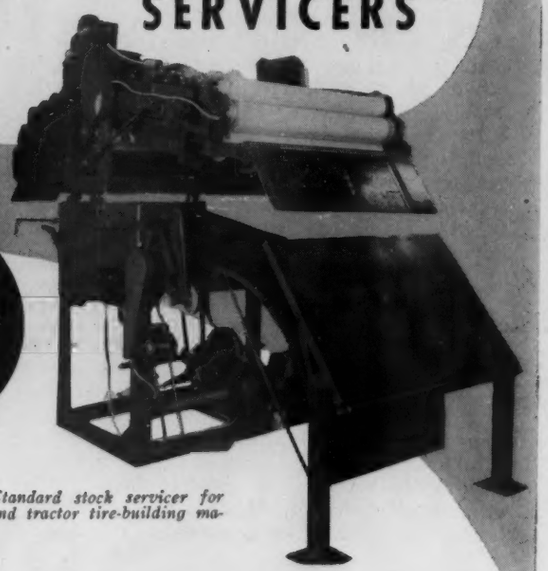
Help Your Tire Builders

Speed Up with

AKRON-STANDARD STOCK SERVICERS

Akron-Standard stock servicers are made in many sizes. Both sets of stock rolls are connected together by chain drive to sprockets from motors mounted on side of frame.

FOR USE WITH ANY SINGLE OR DUAL BEAD TIRE-BUILDING MACHINE



Akron-Standard stock servicer for truck and tractor tire-building machines.

Another Akron-Standard aid to modern, streamlined production—a stock servicer which supplies material to the tire builder without leaving his position (ideal for women operators). It handles plies, chafers, tread and breaker. No placing of fabric in loose liners—no more unnecessary handling anywhere! Uniform tension makes for a uniform product.

The tire builder controls each roll with an index button which operates the motor drive. A limit switch automatically stops the roll. The stock rolls are filled so that each ply comes in proper sequence with the cord angles reversed correctly as applied to the drum. The Akron-Standard stock servicer is ideal for any machine building passenger, truck or tractor tires.

Details. On one side of the upper unit are 12 rolls, six of which carry the self-winding liner and six the stock fabric for the operator. The stock is fed to the rolls at the back. When filled, the turret is turned for the next tire.

Ask for our 40-page Bulletin "A-9", describing this and many other profit-earning types of Akron-Standard equipment.

The Akron Standard Mold Co.

1624 Englewood Avenue — *"The Established Measure of Value"* — Akron 5, Ohio, U. S. A.

They Have to Satisfy You to Satisfy Us

THESE are the field men of the Goodyear Chemicals Division. They're salesmen—with an important difference. Their usefulness to us is determined by the extent to which they serve you.

These experienced rubber men can serve you in three ways:

1. In providing you with valuable data that may help you formulate better, more durable rubber compounds with **Pliolite S-6.**

2. In helping you get the best possible results with your **Pliolite S-6** formulations.

3. In keeping you informed on the improvements and advancements flowing from the Goodyear Research and Development Department.

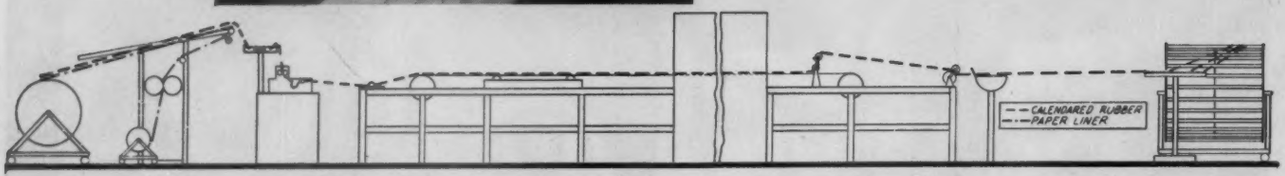
Remember these men. And call upon the one nearest you, next time you seek a reinforcing agent with the longer flex-life, the superior tear- and abrasion-resistance of **Pliolite S-6.** Goodyear, Chemicals Division, Akron 16, Ohio.

Pliolite—T.M. The Goodyear Tire & Rubber Company

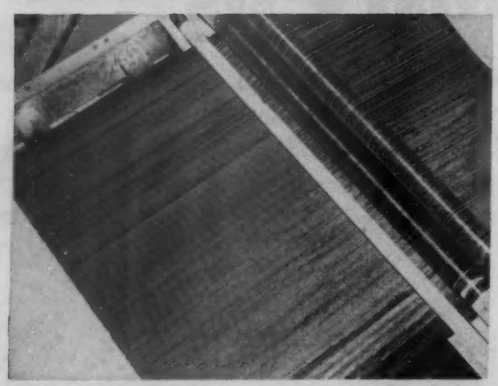
GOODYEAR

Note the small calender running a 9 inch width roll. Equipment cost is low compared to conventional methods.

New ANDAL PROCESS*



Sheet rubber from calender is conveyed to Andal cutter and cut in threads *before* vulcanization. Cutting waste is re-calendered.



Finished thread is taken off conveyor on vertical rolls and feeds through duster on to drums.

From drums the finished thread is inspected and chained.

PRODUCES BETTER CUT RUBBER THREAD AT LOWER COST . . .

Highly Practical in Units for 50,000 lbs. Annual Production and Up

★ **LOW INVESTMENT**
Small calender — No pot heaters — No large cutting drums.

★ **LOW LABOR COST**
Semi-automatic process from uncured thread to wind-up of finished thread.

★ **LOW RAW MATERIAL COST**
Plantation rubber and simple compounds — Thread cut before vulcanized — Scrap reworkable.

★ **LOW SPACE REQUIREMENTS**
Small floor for mills, calender, cutter and processing. Oven may be overhead.

PRODUCES HIGHEST QUALITY THREAD

- ★ Cut edges heat-sealed
- ★ Thread hot-wax coated
- ★ No liner or cutter marks
- ★ Long lengths
- ★ High tensile
- ★ Uniform cure

Write or cable for full details of this revolutionary low-cost process.

The ANDREWS-ALDERFER PROCESSING CO.
120 Ash St. AKRON 8, OHIO, U. S. A.

Franchise **ARRANGEMENTS**

Now being negotiated for certain countries abroad. Rights include complete technical assistance in all phases of thread processing.

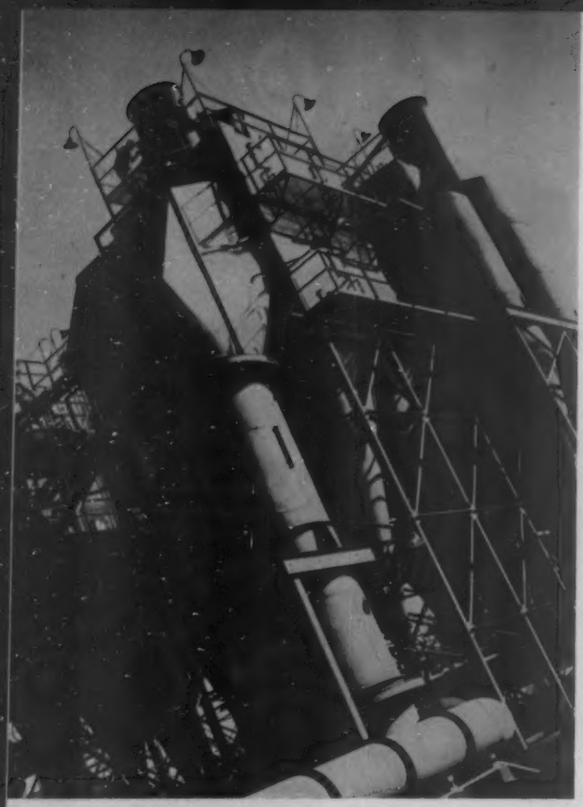
★ **ANDAL PROCESS**
Patented in the U. S. A. and foreign countries

CARBON BLACKS

UNITED CARBON COMPANY, INC.

CHARLESTON 27, W. VA.

NEW YORK • AKRON • CHICAGO • BOSTON



Close-up of coolers, precipitators, and cyclone collectors in one of the twelve units of our furnace black plant at Ryus, Kansas.

Just Think...

With KOSMOS 40

You Have the Following Advantages...

Low Compounding Cost
Wide Flexibility
Cool Mixing
Easy Processing
Rapid Extrusion
Fast Rate of Cure

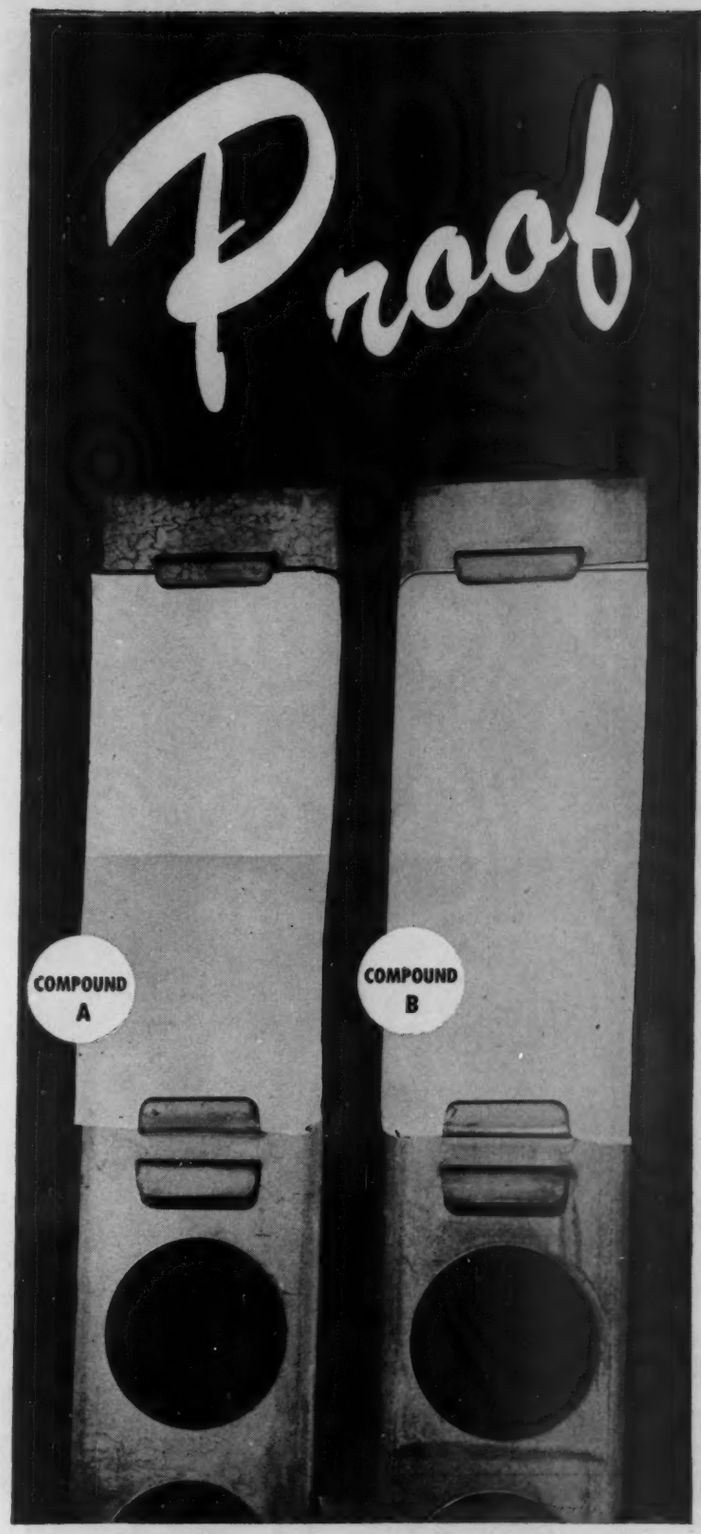
High Reinforcement
Low Heat Build-Up
High Resiliency
Good Aging
Minimum Flex Cracking
Minimum Cut Growth

Standardize on Kosmos 40 — a high modulus furnace black (HMF) — for best economy, outstanding performance and all around satisfaction.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston 27, West Virginia



Unretouched Photo

that Plasticizer

VISTAC #1

INHIBITS DISCOLORATION

In White or Light Colored Stocks

Fadeometer tests made for 44 hrs. graphically illustrate the superiority of white and light colored stocks plasticized with Vistac #1. Upper half of each sample shows original color.

COMPOUND A
Contains 1% Vistac per 100 parts rubber

COMPOUND B
Contains 3% Vistac per 100 parts rubber

Vistac #1 is non-toxic, non-staining, odorless, and does not itself discolor stocks or white enamels.

Vistac #1 is particularly recommended for

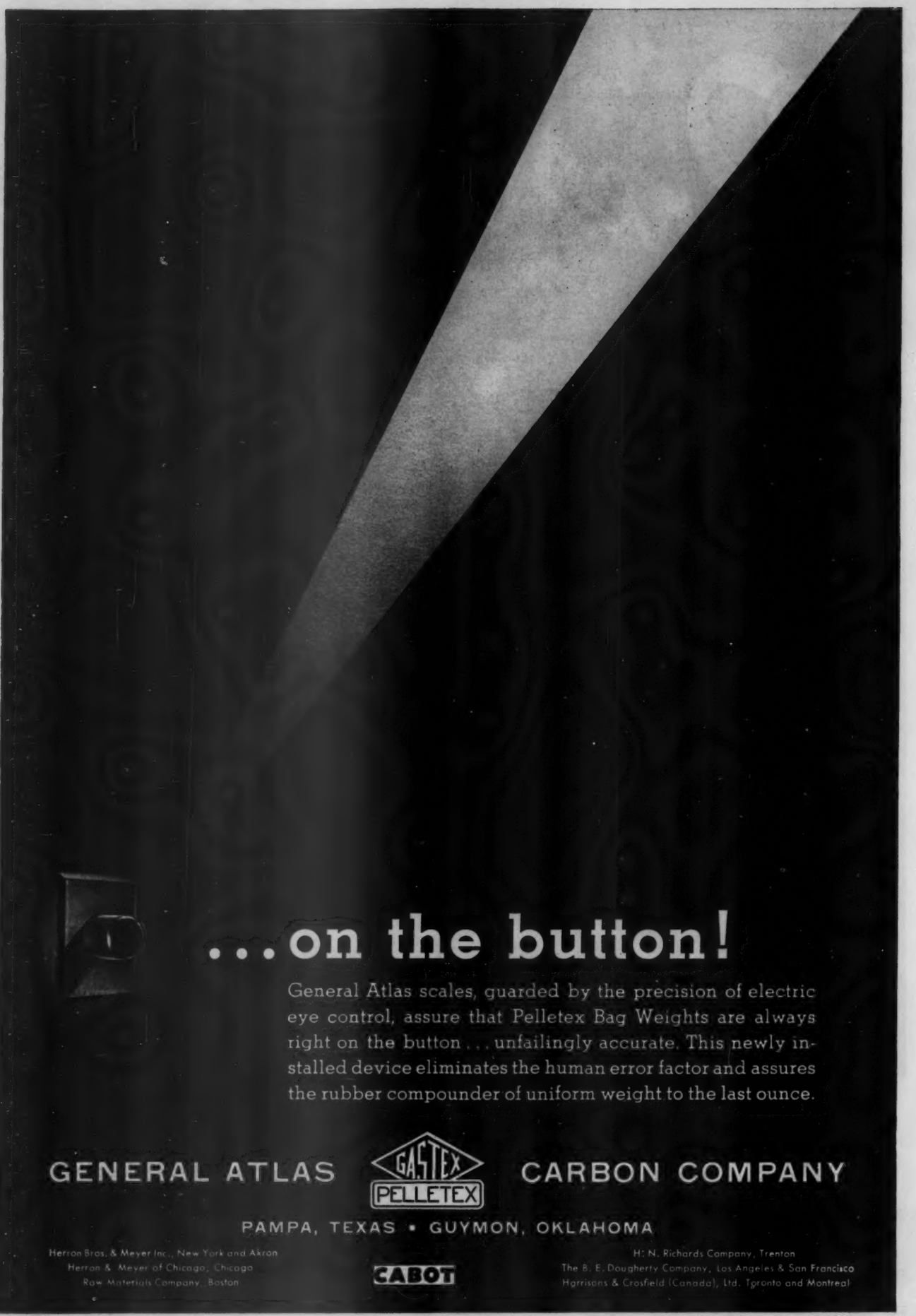
- **White Sidewalls**
- **Drug Sundries**
- **Refrigerator Gaskets**
- **Jar Ring Stocks**
- **Vacuum Seals**

Physical Properties of Vistac #1:

Specific Gravity	0.900
Pounds Per Gallon	7.5
Color	Almost Water-White
Saybolt Univ. Visc. (210°F)	2800+ secs.

Write for our new booklet on the use of
VISTAC #1 in NATURAL RUBBER and GR-S

Advance Solvents & Chemical Corp.
245 Fifth Avenue • New York 16, N. Y.


...on the button!
General Atlas scales, guarded by the precision of electric eye control, assure that Pelletex Bag Weights are always right on the button . . . unfailingly accurate. This newly installed device eliminates the human error factor and assures the rubber compounder of uniform weight to the last ounce.
GENERAL ATLAS
GASTEX
PELLETEX
CARBON COMPANY
PAMPA, TEXAS • GUYMON, OKLAHOMA
Herron Bros. & Meyer Inc., New York and Akron
Herron & Meyer of Chicago, Chicago
Raw Materials Company, Boston
CABOT
H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles & San Francisco
Harrisons & Crosfield (Canada), Ltd. Toronto and Montreal

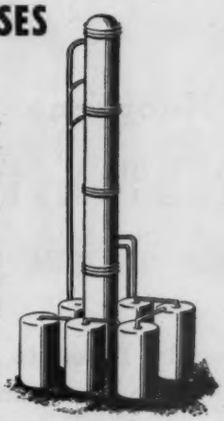
Announcing

SWIFT'S FATS and FATTY ACIDS

for technical uses

Swift & Company is now inviting inquiries on its new lines of fatty acids and fractionated glycerides. Extensive use of solvent processes will make possible new high standards of purity and stability.

1 THE PROCESSES



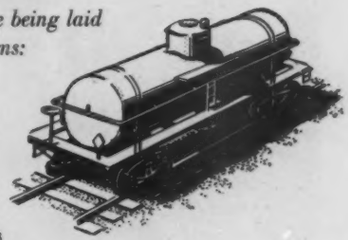
Solvent processes yield fat fractions of higher quality and wider usefulness. Most of Swift's new fats and fatty acids will be processed with solvents.

Unsaturated acids and drying oils will be separated by the Solexol process, using propane as a solvent. Fractions are separated selectively at temperatures not exceeding 200 degrees F. Since thermal and chemical side reactions are thereby avoided, products of greater purity and stability are obtained.

Saturated acids will be fractionated by solvent crystallization. Here, too, processing temperatures are low and harsh catalysts are absent, so that the natural structure of the substances is preserved.

2 THE PRODUCTS

Production plans are being laid for the following items:



Swift's Mixed Fatty Acids
Swift's Cottonseed Fatty Acids
Swift's Animal Fatty Acids
Swift's Linseed Fatty Acids
Swift's Corn Oil Fatty Acids
Swift's Soybean Oil Fatty Acids
Swift's Palm Oil Fatty Acids
Swift's Hydrogenated Marine Oil Fatty Acids

Swift's Fractionated Fatty Acids
Swift's Stearic Acid
Swift's Oleic Acid

Swift's Drying Oils
Swift's Fractionated Sardine Oil
Swift's Fractionated Menhaden Oil
Swift's Fractionated Soybean Oil
Swift's Fractionated Linseed Oil

Other Swift Glycerides
(*now in production*)
Swift's Lard Oils
Swift's Tallow Oil
Swift's Marine Oils
Swift's Neatsfoot Oil
Swift's Sperm Oil

Specialties
(*now in production*)
Swift's Sulfonated Sperm Oil
Swift's Sulfonated Tallow Oil
Swift's Sulfonated Castor Oil (Turkey Red Oil)
Swift's Sulfonated Neatsfoot Oil
Swift's Spermaceti
Swift's Textile Oils
Swift's Anti-foam Agents

3 SWIFT'S TECHNICAL PRODUCTS SERVICE

It brings you:

Representatives who know your problems and requirements.

Product technicians available for consultation on any Swift technical product.

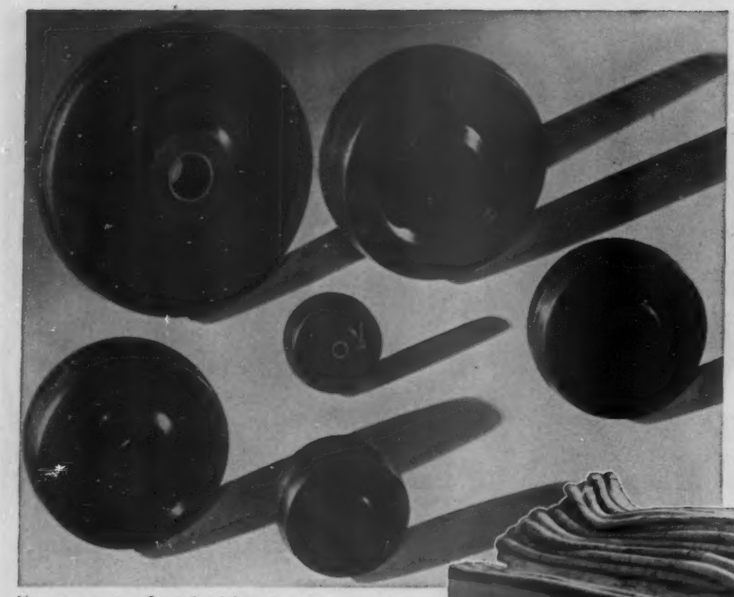
Exploratory research developing products to further increase the efficiency of your operation.

This team is at your service now. Make use of it today!

Address inquiries to:

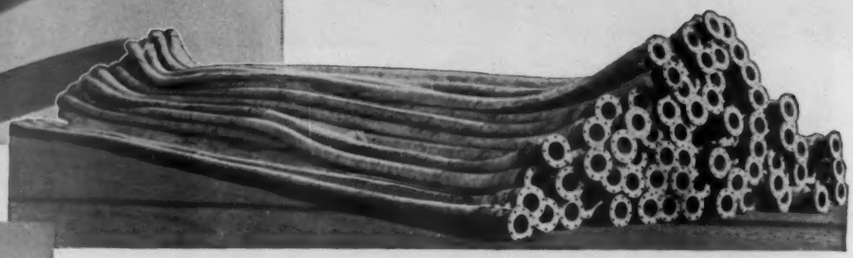
SWIFT & COMPANY

INDUSTRIAL OIL DEPARTMENT
Union Stock Yards, Chicago 9, Ill.



Neoprene casters for industrial trucks. Courtesy L. H. Gilmer Company, Division U. S. Rubber Company.

V-Belt drive on mechanical rotary drilling oil jig. Courtesy L. H. Gilmer Company, Division U. S. Rubber Company.



Neoprene oil suction and discharge hose for marine service. Courtesy Quaker Rubber Corporation, Philadelphia.

Neoprene covered seismograph cable. Courtesy General Geophysical Company.

Leading Neoprene Compounders Use

K&M LIGHT MAGNESIUM OXIDE

for products that must do a hard day's work

From high-quality Dolomite rock, Keasbey & Mattison Company extracts magnesia and processes it into MgO that is feather-light and absolutely uniform. Many leading neoprene compounders insist on K&M Light Magnesium Oxide because they have found it is always dependable, always top quality.

For your neoprene products—no matter what their ultimate use—there are advantages to be gained by using K&M Light Magnesium Oxide. Write to us, or to our distributor listed below.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

One of America's oldest and most reliable makers of asbestos and magnesium products

DIAMOND ANNIVERSARY 1873 1948 K&M KEASBEY & MATTISON CO.

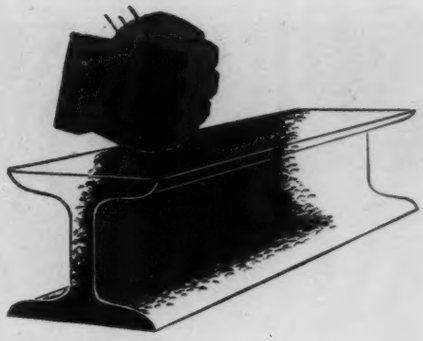
Our Distributor for K&M Light Magnesium Oxide is

AMERICAN CYANAMID COMPANY

30 Rockefeller Plaza, New York 20, N.Y.

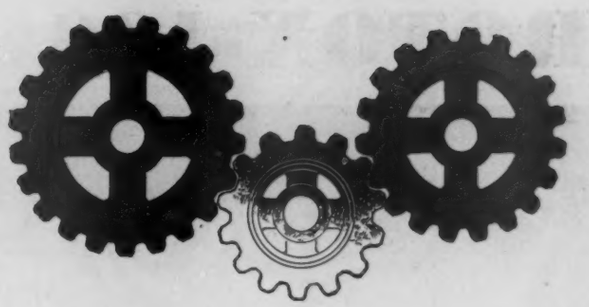
with the following sales representatives to the rubber industry and stock points:

AKRON, OHIO, Akron Chemical Company • BOSTON, MASS., Ernest Jacoby & Company
CHICAGO, ILLINOIS, Herron & Meyer • LOS ANGELES, CAL., H. M. Royal, Inc.
TRENTON, N. J., H. M. Royal, Inc.



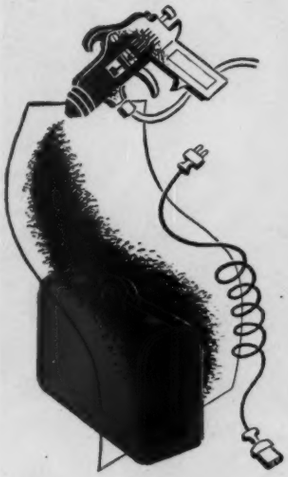
SUPERIOR TOUGHNESS

Marvinol's high molecular weight offers you extra toughness and "dryness," longer durable life, greater flexibility, resistance to tear, wear, oils, acids. Marvinol-based products are waterproof.



CLOSE COOPERATION

The Glenn L. Martin Company compounds and fabricates only in its customer service laboratory for your benefit. We sell only raw materials. Let our field engineers and customer research laboratory help solve your processing problems. The new ultra-modern Marvinol plant is equipped to insure uniform product of highest quality.

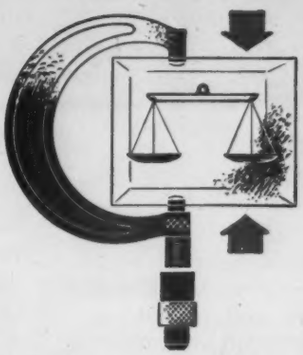


Superior Characteristics of MARVINOL® Vinyl Resin offer you many advantages...

UNIQUE VERSATILITY

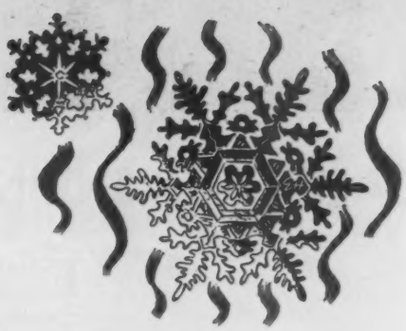
Marvinol VR-10, a polyvinyl chloride-type resin, is readily handled ... may be calendered, extruded, injection molded, used in non-aqueous dispersions, formulated as unplasticized rigids, with distinctive coloring from clear to delicate or brilliant shades that are easy to clean.

WRITE TODAY on your company letterhead for details about Marvinol VR-10. Take advantage of expertly trained Marvinol sales engineers and our modern customer research laboratories. For full information address: Chemicals Division, Dept. R-9, The Glenn L. Martin Company, Baltimore 3, Maryland.



GREATER STABILITY

In processing and in end products, Marvinol offers superior resistance to heat, light, other normally destructive forces.



BROAD TEMPERATURE RANGE

Marvinol resins assure you end products that show less deformation due to heat and better low temperature flexibility.

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RESINS, PLASTICIZERS AND STABILIZERS, PRODUCED BY THE CHEMICALS DIVISION OF
THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION
"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

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CALENDER SHRINKAGE

EQUAL PARTS by weight of zinc oxides of varying physical and chemical properties, and of natural rubber were compounded and mixed under the same conditions, and allowed to stand overnight. The following day the stocks were warmed up and calendered. A device attached to the calender marked the specimens at regular intervals.

On cooling, the contractions for the several brands were as follows:

Protox-166	—	39.4%
Zinc Oxide-A	—	46.7
Zinc Oxide-B	—	49.0
Zinc Oxide-C	—	59.2

We'll gladly discuss the value of PROTOX-166 in your processing, whether it involves calendering or tubing, and send you a sample for testing. By the way PROTOX-166 was formerly known as XX-166, and it carries *no* price premium.

* *U. S. Patents 2,303,329 and 2,303,330*

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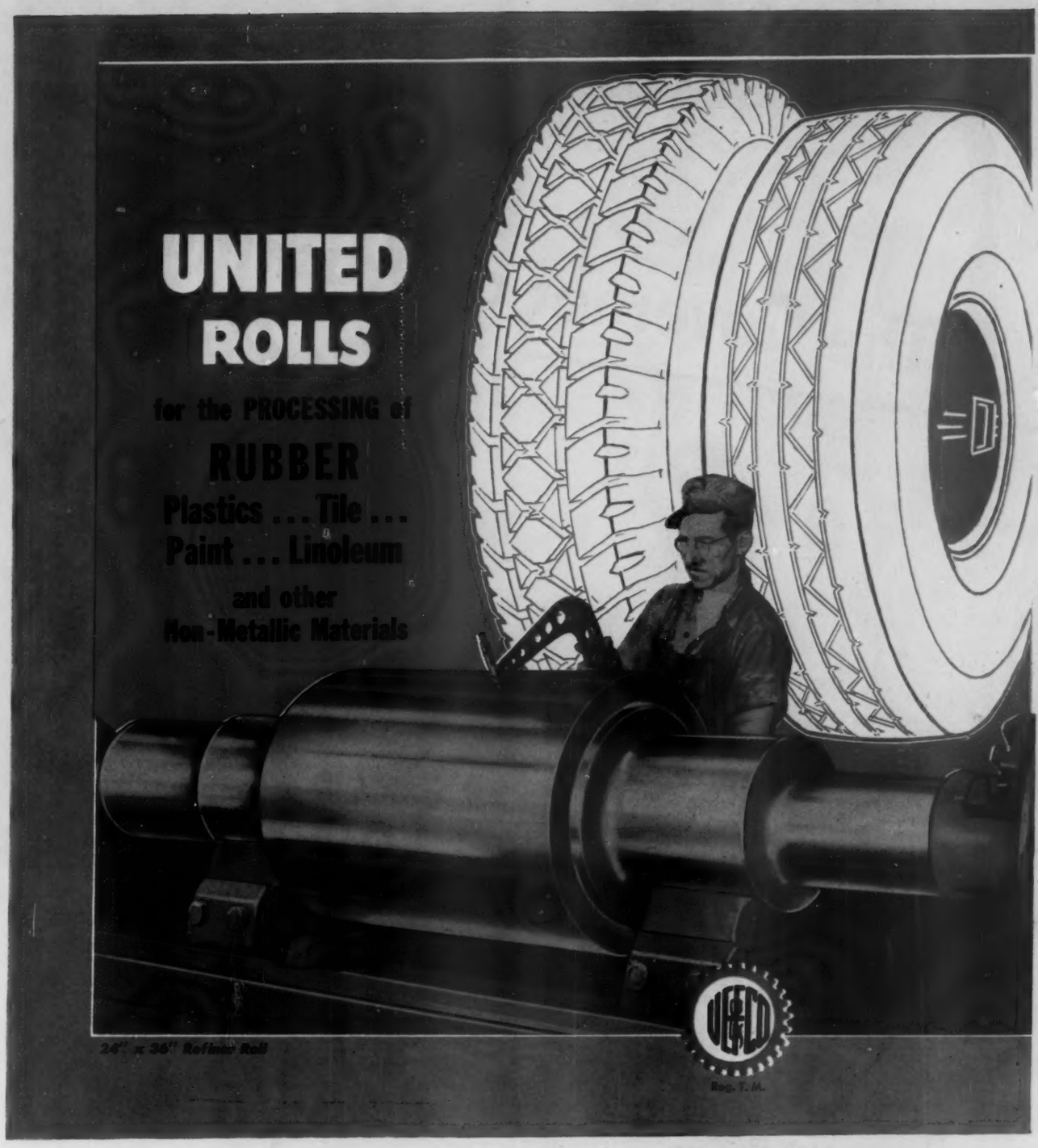

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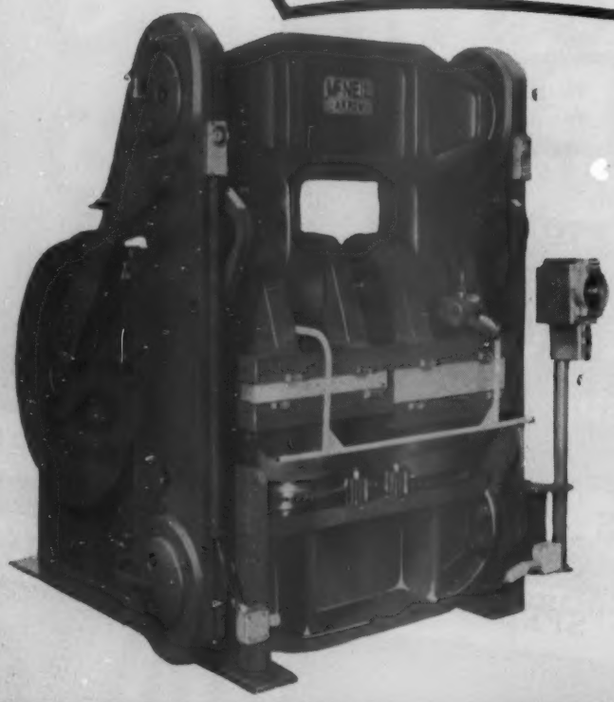

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- Increase stiffness . . . by its natural cured rigidity.
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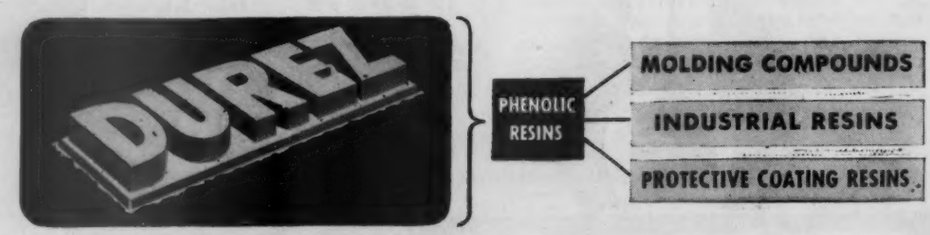

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CONTENTS

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3. Marks and the Alkali Process
4. Miscellaneous Reclaiming Processes
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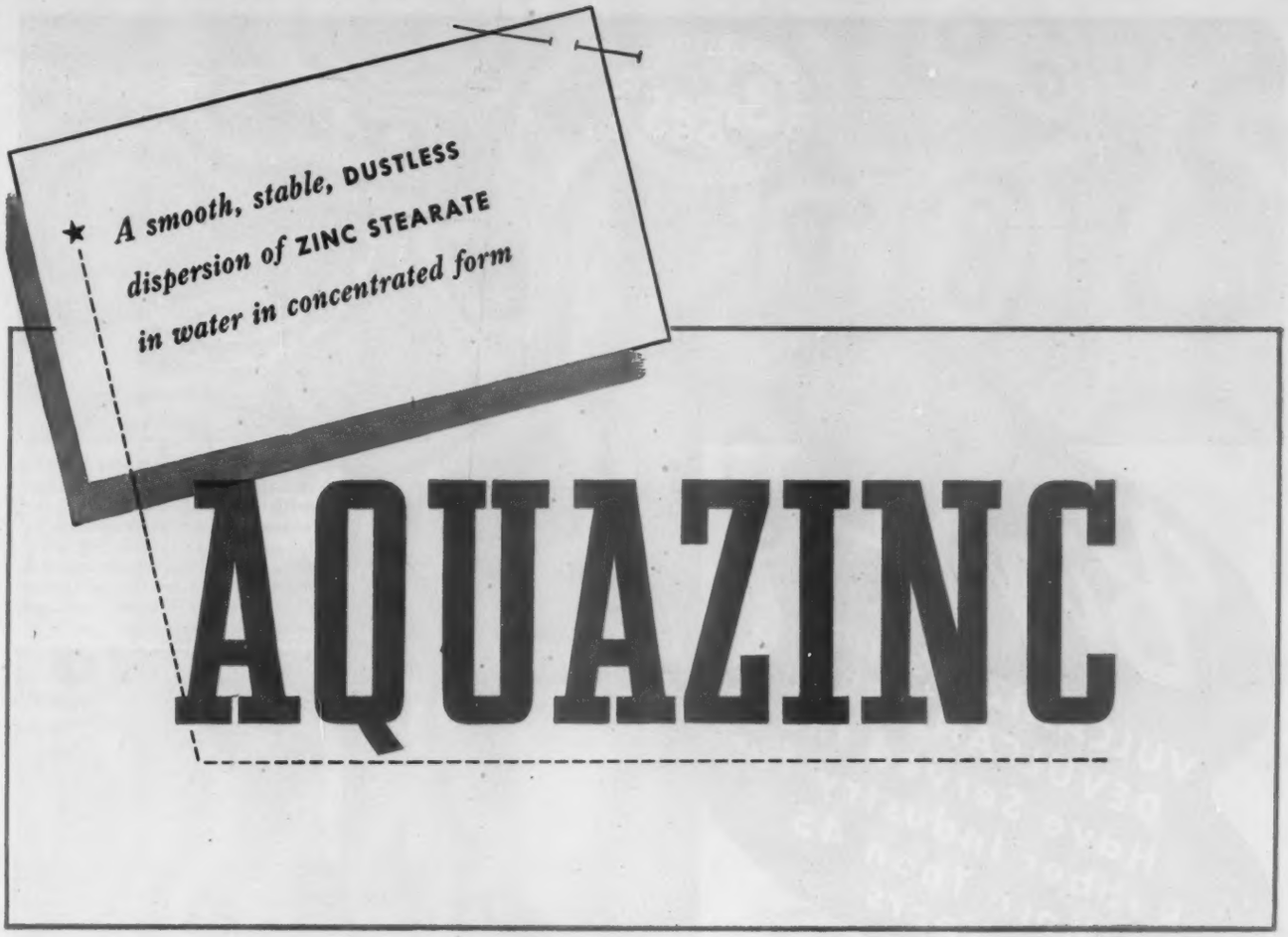

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Fig. 3—vertical vulcanizer with quick-opening door. Door is handled by self-contained arm and gear-operating mechanism. Hand or motor operation.

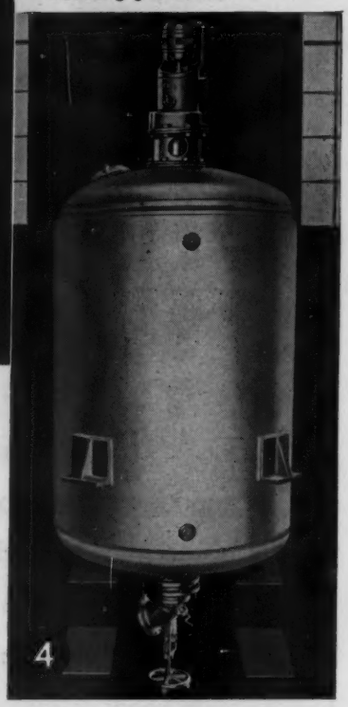
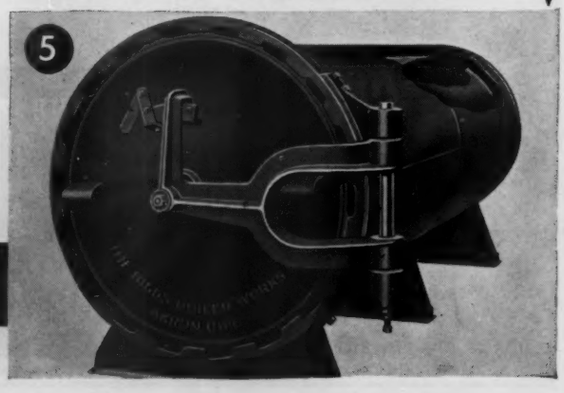


Fig. 4—high pressure heavy duty jacketed vertical devulcanizer with special agitator. Furnished in various sizes.

Fig. 5—horizontal steam-jacketed vulcanizer with hinge type quick-opening door; all sizes, for various working pressures. Welded construction throughout.



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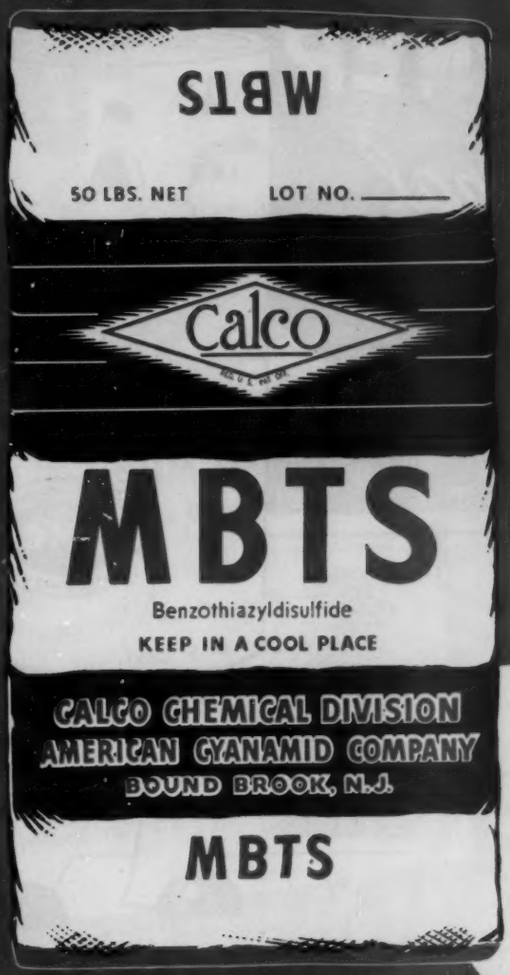

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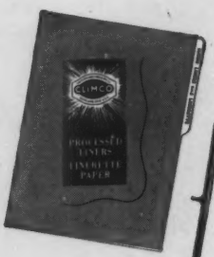

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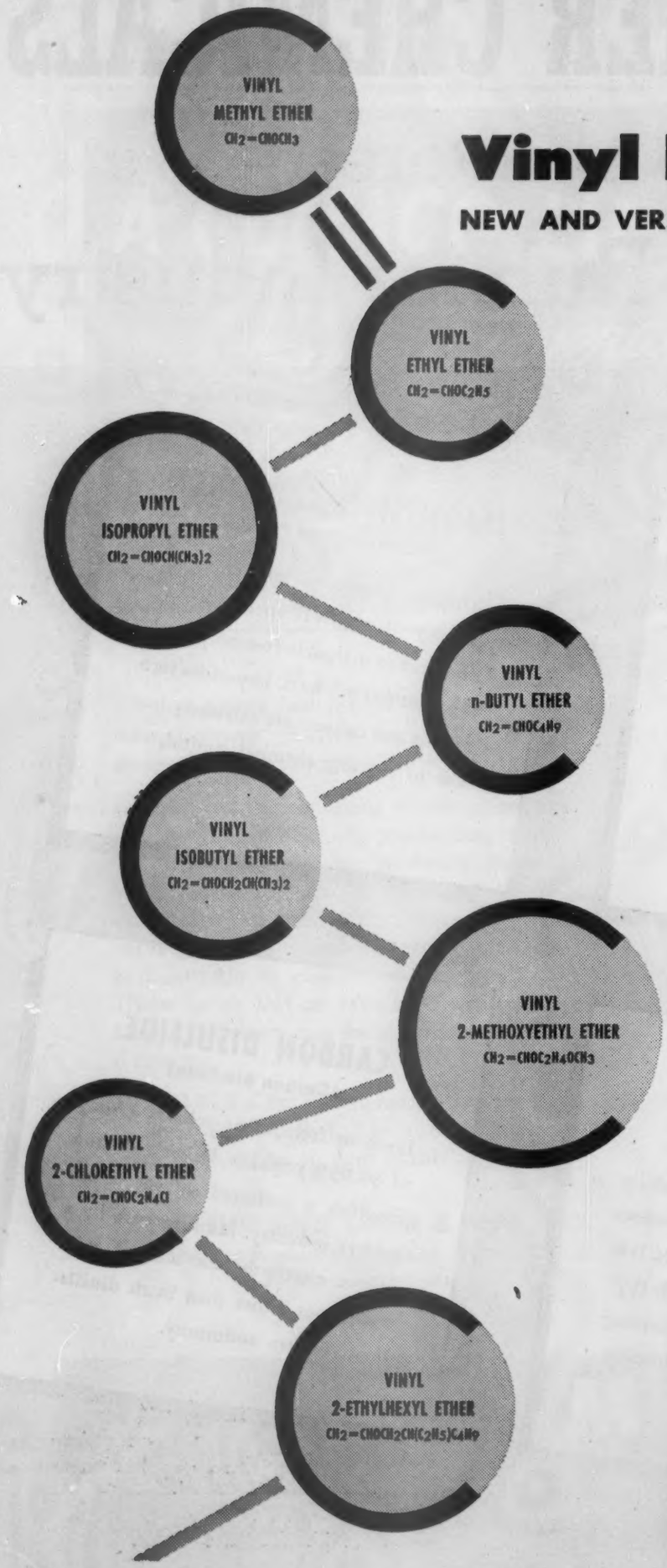

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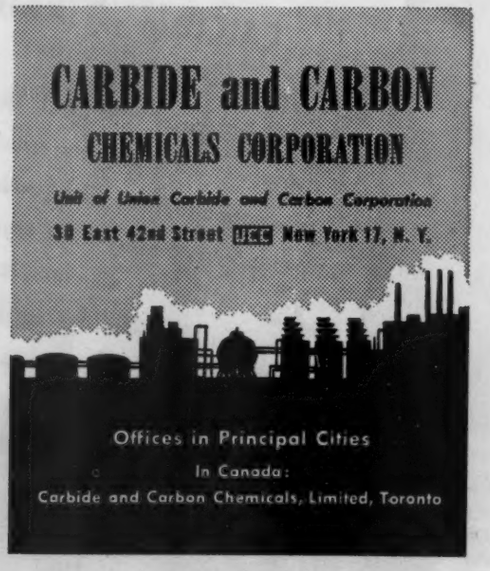
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	Flexural Strength psi	1500-1700
	Impact Strength Izod ft lbs/in notch	> 3
	Rockwell Hardness	R-25-R-35
	Elongation %	50-600
PHYSICAL	Specific Gravity	.92
	Specific Volume cu. in/lb.	30.1
	Water Absorption 24 hours. %	< .005-01
	Effect of Sunlight	No discoloration
STD. GAUGES	.001 .0015 .002 .0025 .003	
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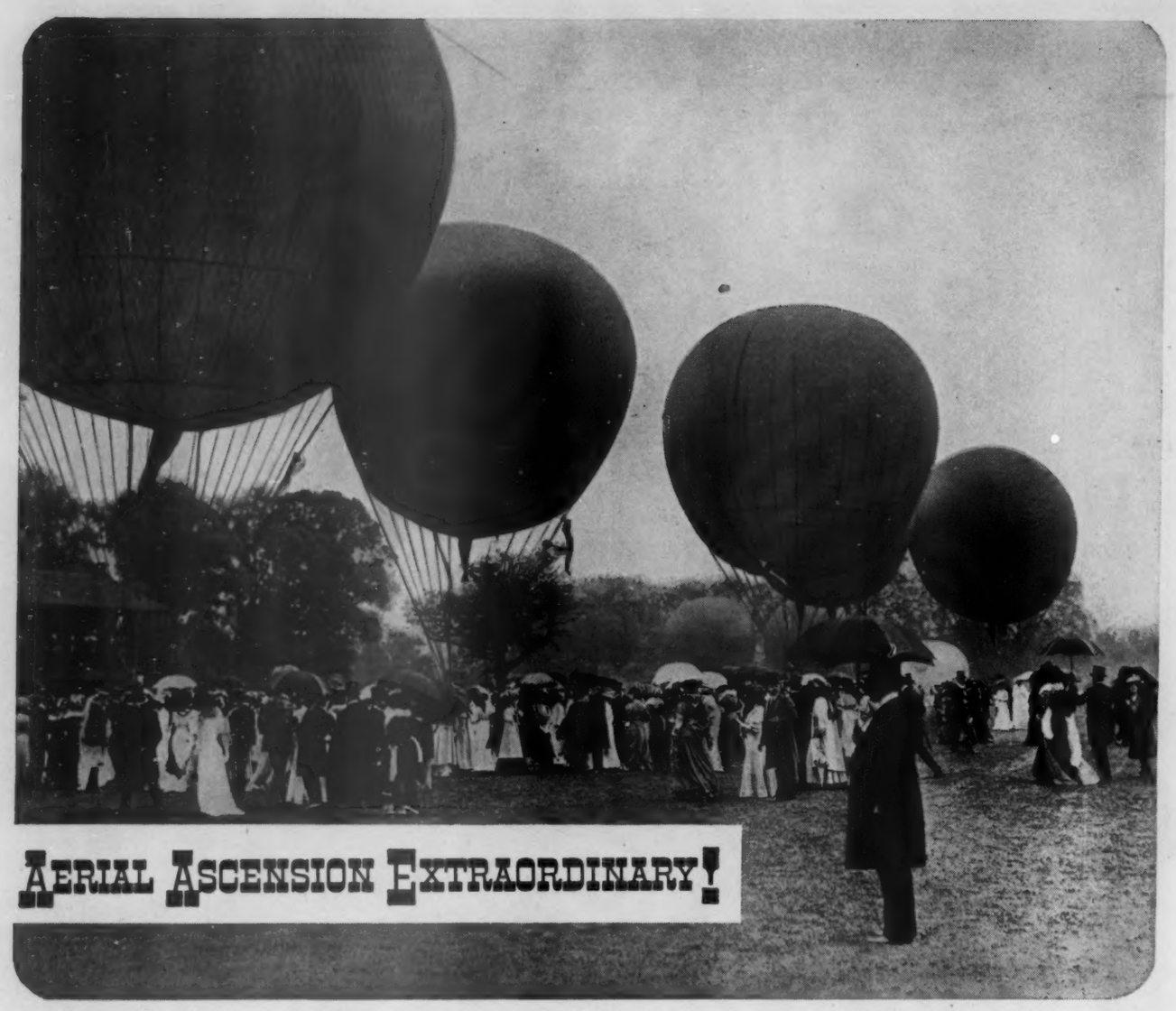
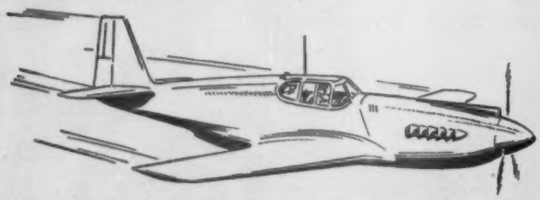


AERIAL ASCENSION EXTRAORDINARY!

In the Gay Nineties when daring "aeronauts" were making breathtaking flights propelled only by the breeze... Esso Standard had just begun to study and experiment with light fraction petroleum refining.



TODAY fast planes send man hurtling through space. At high speeds every part must function smoothly, which is one of the reasons manufacturers insist on dependable Esso Solvents in the fabrication of shock absorbers, brake linings, tires and other important aircraft equipment. Esso Solvents are used today in everything from toy balloons to modern blimps, from furniture polish to building materials, from automobiles to textiles... wherever uniform high quality and stability is required.

WHATEVER your manufacturing process... whatever your solvents requirements... you can be sure that Esso Solvents and our staff of technical experts can help you solve your problem. Call or write our office nearest you.

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Now, with the swing back to crude, we want to remind you that Santocure still offers all the qualities that make it the superior accelerator for vulcanizing *natural* rubber. Furthermore, it is available for immediate shipment in any quantity.

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Santocure: Reg. U. S. Pat. Off.

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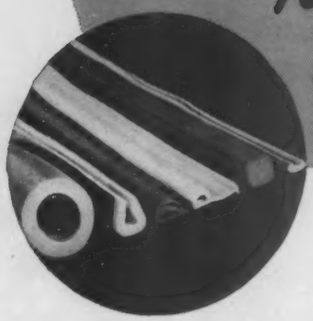
for better performance in extrusion machines



Extrusion molding of silicone rubber need no longer be a problem. General Electric research has developed a family of silicone rubber compounds that flow smoothly, handle readily, and *hold their uncured shape.*

G-E silicone rubber compounds can be transfer or compression-molded as well as extruded. Use your present equipment and techniques. You'll be pleased not only with the better performance of these new stocks but also with the remarkable characteristics of this new material. Parts made from G-E silicone rubber compounds stay resilient from —70 F to 520 F.

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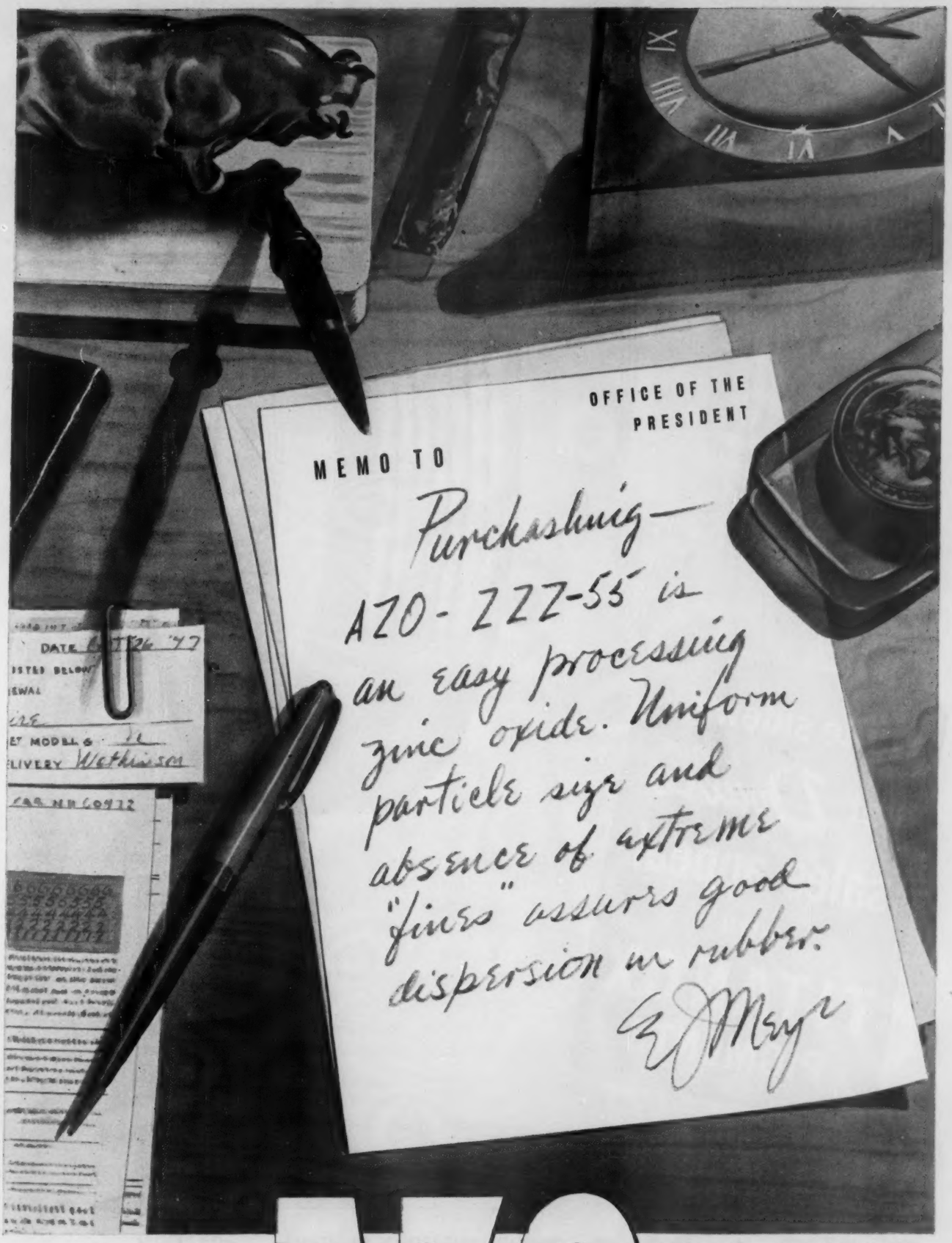
CD48-AB9



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Boron Fluoride Etherate is an unusually versatile liquid catalyst, offering multiple advantages and economies for a wide range of reactions, including polymerization, alkylation, arylation, condensation, isomerization, esterification, cyclization. It combines the catalytic properties of BF_3 with the ease of handling and exact dispensability of a liquid. In operation after operation it has proved superior to many other catalysts because:

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- **Little or no extraneous material is introduced into the system.**
- **Reactions are moderated or more easily controlled.**
- **Operating temperature ranges are wider.**
- **Yields are increased.**
- **Separations are easier and no bulky sludges are formed.**
- **Properties of end-products are improved.**
- **More reactions are carried to completion.**
- **Fewer undesirable waste materials result.**

Boron Fluoride Etherate is available in 5-, 20- and 55-gallon drums for commercial applications as well as in one- and five-pound bottles for research purposes. For experimental samples and list of technical references on uses, etc., please make request on business letterhead.

OTHER BF_3 CATALYSTS: Fully equipped to handle gaseous BF_3 in producing its compounds with other complex-forming chemicals, Baker & Adamson is ready to work with you in the development of BF_3 catalysts to meet your specifications. This is of special significance since BF_3 can often be coordinated with products entering into the reactions in which it is the active catalyst.

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3 Cyclization of synthetic and natural elastomers after polymerization or in starting from monomers.

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- ★ FLEXIBILITY AT LOW TEMPERATURE
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Heavy-duty Mills, in all sizes up to 84 inches, featuring extra heavy construction, smooth operation, and long life.

Laboratory Mills furnished with built-in motor, control and adjustable speed drive. Entirely enclosed ready to operate. Mechanism is readily accessible.

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now producing specialized asphalt materials

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Witco Asphalts for the Rubber Industry:

Pioneer Hydrocarbons (Mineral Rubbers)—extending plasticizers for rubber compounding derived from petroleum sources. Two grades are available: "Black Diamond"* and No. 38.

Softeners for heavily loaded stocks giving marked plasticizing action without alteration of cure rate. Made in several grades to cover various applications.

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GLYCERIZED LUBRICANT
(LIQUID CONCENTRATE)

RUBBER PROCESSING MATERIALS
FOR NATURAL, SYNTHETIC AND RECLAIM RUBBERS

GLYCERIZED LUBRICANT
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for hot rubber slabs to prevent adhesion when piled . . . banishes dust nuisance by replacing soapstone, talc . . . prevents sticking during cure of extrusions, tubing when coiled on flat pan . . . excellent lubricant for molds, mandrels, air bags, belt drums, etc. . . . washing, finishing inner tubes, etc.; imparts satiny finish . . . ideal for processing insulated wire, cables . . . truly versatile lubricant for natural, reclaim or synthetic rubbers.

RUBBEROL

Rubber-Like, Plastic Material

gives internal lubrication to reclaim, natural and reclaim rubber compositions . . . aids dispersion during milling . . . replaces softeners . . . eliminates sticking of stocks on rolls . . . helps plastic flow during molding . . . prevents sticking in molds . . . adds luster to finished articles.

SYNTHOL

Tackifier and Plasticizer for Synthetic Rubbers

cuts down milling time . . . incorporates clean, easily, quickly . . . assimilated almost instantly, lowers production costs . . . effects tremendous savings in labor, milling time compared to oils, greases . . . yields nerveless, tacky, highly resilient, odorless stocks . . . "brings back" scorched synthetic, natural rubber, "set up" Neoprenes . . . creates permanent tack in Butadiene-type synthetic rubbers.

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RUBBER MATERIALS DIVISION

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Sure cure FOR A M.P.P.H.* HEADACHE!

**Minimal pounds per hour*

New National Heavy Duty Tubers Can Provide the "Remedy"

IF your production schedule is suffering from "M. P. P. H."—minimal pounds per hour—look to *National* for the "cure"!

For the new National Heavy Duty Tubers will produce many *more* pounds per hour at lower working temperatures than your old tubing equipment, with synthetic as well as natural stocks.

NRM engineers work unceasingly for the sole purpose of building heavy duty tubing machines that anticipate the ever changing needs of the rubber industry.

National Tubers' advanced design and resultant economy in the use of electrical power, closer control of stock dimensions and a more accurate control of processing temperatures will insure lower production costs and a consistently *better* product.

A factual bulletin covering the many superior features of NRM Tubing Machines in models ranging from 2″ to 12″ screw diameters, is available to you. It will be mailed upon request.

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1. CYLINDER HEADS in all production sizes, available with adapters for water cooling.
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3. HEAVY CAST IRON CYLINDERS, water jacketed, with removable spiral sleeve equipped with XALOY bushing.
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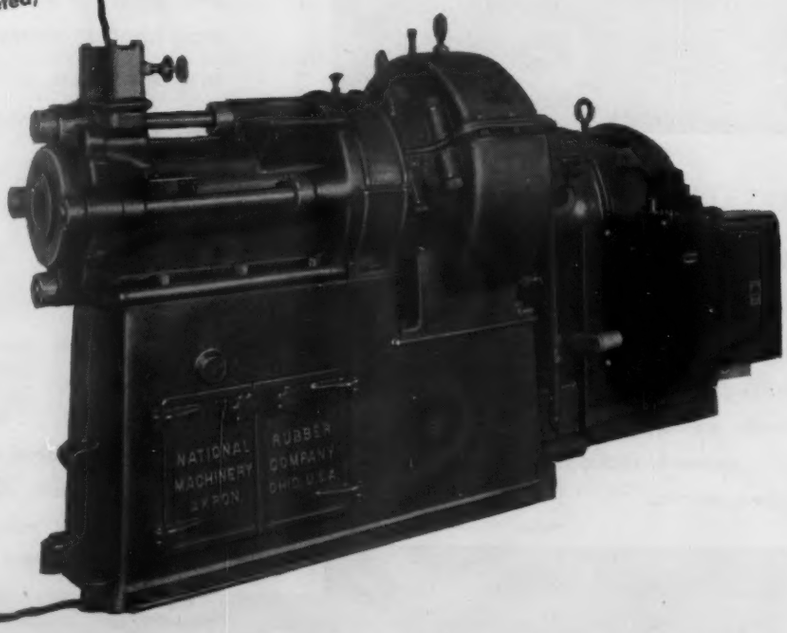
5. MANIFOLDS are built in and equipped with four valves for heating or cooling cylinder.
6. STRESS RODS are extra heavy to insure perfect alignment of head and cylinder with gear housing. Precludes breakage.
7. THRUST BEARINGS are anti-friction type. Oversize throughout for added strength.
8. DRIVE GEAR UNITS consist of case hardened steel herringbone gears driven through a flexible coupling.



NATIONAL RUBBER MACHINERY CO.

General Offices: AKRON 8, OHIO

California Representative: Sam Kipp, P. O. Box 441, Pasadena 18, Calif.

Creative Engineering

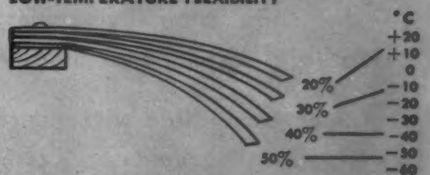
New flame-resistant Monsanto plasticizer

SANTICIZER 141

COMPARATIVE "FLAME-OUT" TIME

These burning rates were determined by placing polyvinyl chloride films (each containing 30% plasticizer) directly in contact with intense flame for 30 seconds. The flame was then removed... The film containing Santicizer 141 supported combustion *for only 1 second*. The other two films, containing other plasticizers, supported combustion for 38 seconds and 44 seconds, respectively.

LOW-TEMPERATURE FLEXIBILITY



The 4 specimen plastic sheets pictured here — containing respectively 20%, 30%, 40% and 50%, by weight, of Santicizer 141 — graphically illustrate the comparative low-temperature flexibilities imparted by Santicizer 141.

Santicizer: Reg. U. S. Pat. Off.

Now available, Monsanto's newest plasticizer — Santicizer 141 — possesses a lower burning rate than any equally efficient plasticizer used in polyvinyl chloride films. It "flames out" in 1 second flat, compared with minimum burning rates of 38 seconds for other plasticizers having the same general characteristics.

One look at the versatile qualities of Santicizer 141 will show you its possibilities for improving your products, whether they be drapes, curtains, upholstery materials, table cloths, floor tiles, wearing apparel or any similar materials.

In addition to exceptional flame retardance, Santicizer 141 possesses the following advantages:

LOW TOXICITY . . . Tests show Santicizer 141 to be one of the least toxic of all plasticizers.

COMPATIBILITY . . . Highly compatible with vinyl resins. Can be used in varying quantities to produce compounds having a wide range of hardness and flexibility.

PERMANENCE . . . Because of its low volatility, Santicizer 141 imparts long life to any compound in which it is used.

DRAPE . . . Films containing Santicizer 141 have a high degree of softness or drape; are pliable, pleasing to the touch.

WEATHERING . . . Exposure to sunlight, rain, water and humidity do not cause excessive deterioration in properly compounded films containing Santicizer 141.

TOUGHNESS . . . Santicizer 141 contributes strength, elasticity and abrasion resistance to such products as upholstery and floor covering materials, shoe soles, luggage covering, wire jacketing.

AVAILABILITY . . . New production facilities will shortly assure ample commercial quantities of Santicizer 141, latest example of Monsanto's continuing leadership in the plasticizer field.

To obtain complete application and technical data on Santicizer 141, write to MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1708 South Second Street, St. Louis 4, Missouri. If you prefer, simply return the coupon.

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY
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Please send me complete information on Santicizer 141.

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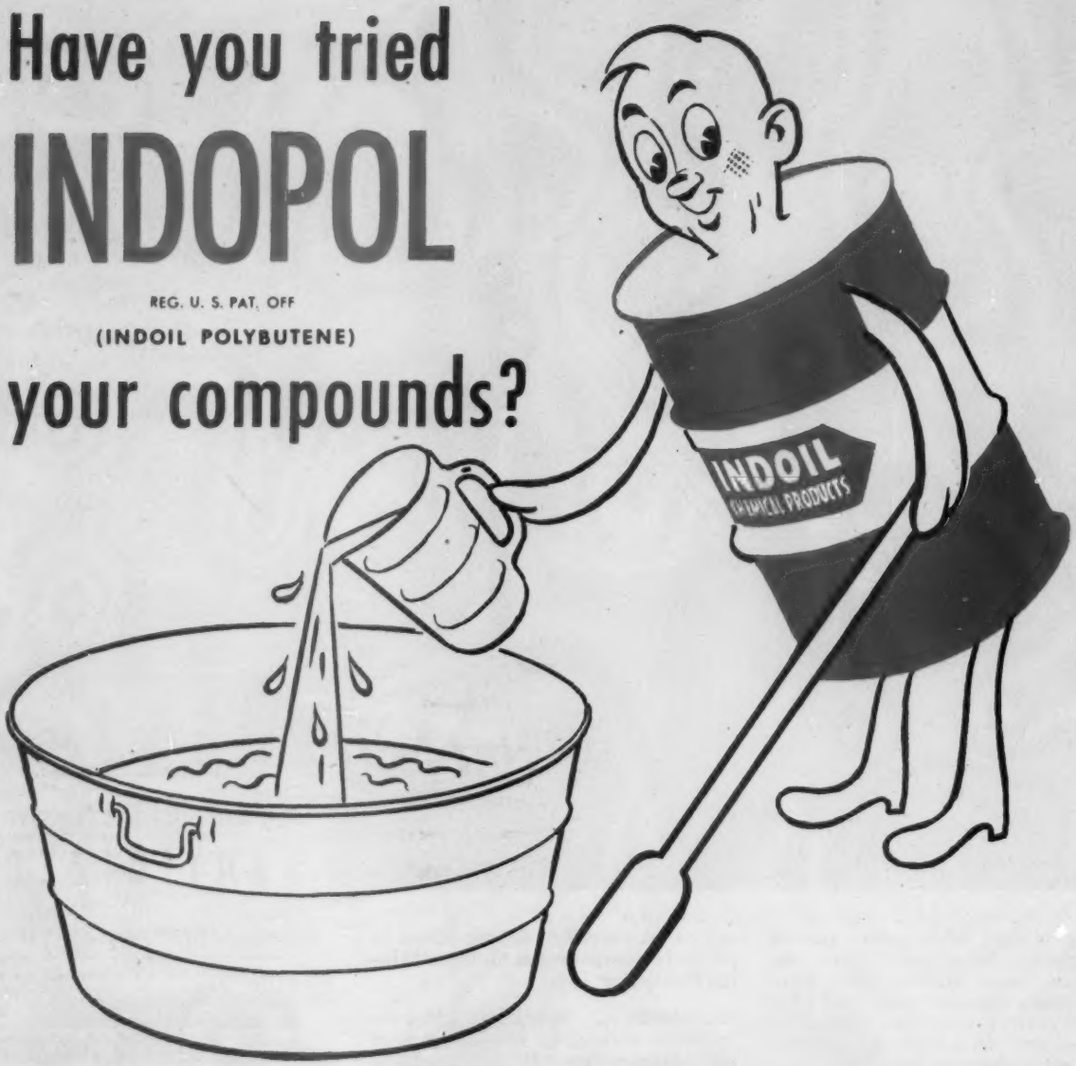
REG. U. S. PAT. OFF

(INDOIL POLYBUTENE)

in your compounds?



The INDOPOLS are synthetic, liquid mono-olefins of high molecular weight. They are light in color and possess excellent sunlight stability—their wide range of viscosities offers varying degrees of building tack in uncured compounds.

Being compatible with natural rubber and with all of the synthetic rubbers except the maximum oil resistance types, the INDOPOLS are of interest as processing aids and softeners to manufacturers of rubber footwear, clothing, household goods, and in other applications where good color is important. Other uses include electrical insulating compositions, caulking compounds and adhesive products.

Seven grades are available ranging in molecular weight from 330 to 940. The Saybolt viscosity of these grades (S. U. seconds at 210° F.) are:

L-10	41 sec.
L-50	68 sec.
L-100	94 sec.
H-35	377 sec.
H-50	540 sec.
H-100	942 sec.
H-300	3,200 sec.

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Chemical Products Department

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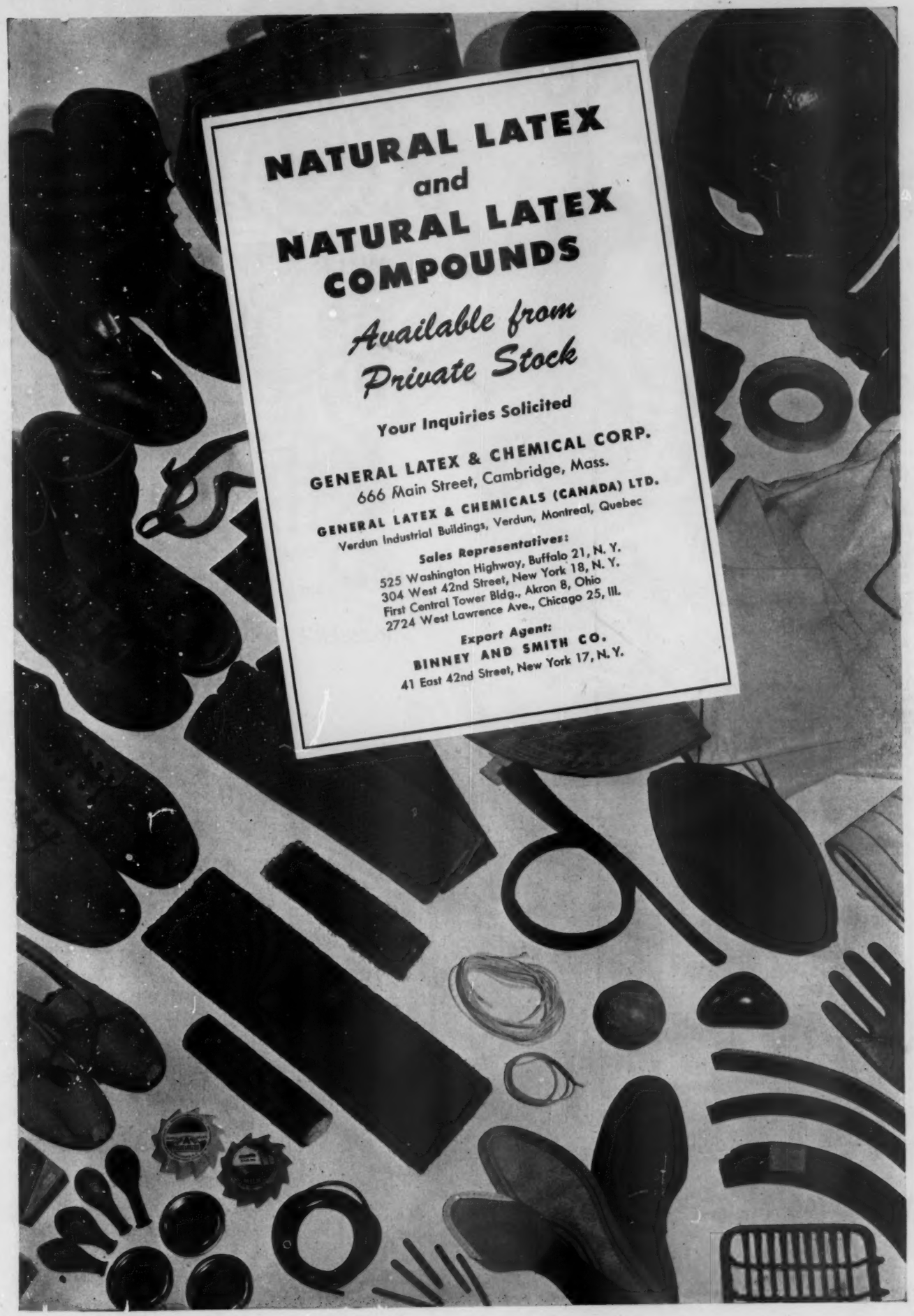
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RUBBER-FLO is ECONOMICAL! The savings in maintenance more than pay for it.

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The flexibility of our Electro-Thermic process makes it possible to produce the grades desired by the consuming industries. The ease of control of our process ensures that the pigment in each bag possesses those chemical and physical characteristics which the zinc oxide's end-use indicates as being desirable.

ST. JOE *lead-free* ZINC OXIDE

ST. JOSEPH LEAD CO., 250 PARK AVENUE, NEW YORK 17, N. Y.

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★ NATAC ★

A Bloom Inhibitor for Natural Rubber and Natural Rubber/GR-S Compounds

Two to four parts of NATAC per 100 rubber hydrocarbon will retard fatty acid and sulphur blooms and impart a lasting tacky surface to tire coat and friction stocks, tire repair materials, laminated mechanical parts, footwear friction, gum parts and similar compounds.

With NATAC, rubber compounds may be worked longer with reduced blooming tendencies usually caused by cold weather, lay-over or rapid chilling. You're safe, too, in adding it to your present compounds or using it in place of other softeners without affecting the physical properties of the cured stocks.

May we send you our descriptive bulletin?

PHYSICAL CHARACTERISTICS

NATAC is a modified resin acid which is neutral with thiazole acceleration in natural rubber.

NATAC is a solid with a softening point (Ball and Ring) of 145°-155° F.

NATAC shatters readily at room temperature and may be added to the batch without previous melting.

NATAC'S specific gravity is 1.082.

J. M. HUBER CORPORATION

342 Madison Avenue · New York 17, N. Y.

HUBER

***Manufacturers of* WYEX (EPC) · MODULEX (HMF) · ESSEX (SRF) · SUPREX CLAY**

The RUBBER AGE

VOLUME 63
NUMBER 6

One of the World's Outstanding Rubber Journals

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RUBBER AGE

Vol. 63, No. 6 SEPTEMBER, 1948

Hysteresis and Heating in Vulcanized Rubber

By S. OBERTO and G. PALANDRI

Pirelli S. p. a., Milan, Italy

The laboratory tests for evaluating energy losses due to hysteresis are analyzed. The importance of taking into consideration the thermal conductivity and cooling conditions of the rubber sample for the evaluation of heat due to hysteresis losses at temperature equilibrium condition is discussed.

Two new test methods based on forced resonance oscillations are described, in which the rubber samples are deformed respectively in shear and in tension at frequencies of 20 to 200 cycles/sec., with dynamic shear strain of 0.02 to 0.4 and dynamic tension strain of 1 to 5%, and at a temperature of 20—110° C.

Experimental results obtained with natural rubber and GR-S gum and tread stocks are presented. The hysteresis losses in gum stocks are found to follow the quadratic law versus dynamic shear strain, and the dynamic modulus G is found to be independent of shear strain. With tread stock the hysteresis losses are lower than would be the case with the quadratic law versus dynamic shear deformation, and the dynamic modulus G decreases with increasing dynamic shear strain.

Neither the hysteresis losses nor the modulus depend on the shape or size of the specimen. The modulus is found to be independent of frequency, while the hysteresis losses are found to increase proportionally with frequency.

As an application of the test method, results are presented of the effect of the quality and quantity of various types of carbon black upon hysteresis heating of GR-S stocks.

THE use of synthetic rubbers, all of which have proved to possess elastic properties inferior to those of natural rubbers, and consequently transform a greater percentage of deformation energy into heat, has led to the necessity of improving the methods for testing hysteresis. Dillon and Gehman* have already published a very detailed description and discussion on the various methods employed for measuring the hysteresis in rubber-like materials. We will in this report confine ourselves to describing only two new test methods developed in the Pirelli Research Laboratories in 1943, and will give some of the results obtained and make some comments on the research work done during the last few years.

* Dillon, J. H., and Gehman, S. D., "Hysteresis and Methods for Its Measurement in Rubber-like Materials," *I.R.W.*, Vol. 115, pp. 61-68, 217-22 (October and November, 1946).

Considerations on the Measurement of Heat Due to Hysteresis

The general problem of the measurement of heat generated by hysteresis losses in cured rubber submitted to periodical stresses can be summarized as follows:

(a) Determination of the stress or strain values in cured rubber products.

(b) Evaluation from laboratory tests of the energy converted into heat per cycle and per unit of volume as a function of stress or strain amplitude and temperature.

(c) Determination by theoretical or graphical calculations, or by means of models, of the distribution of temperature, due consideration being taken of the cooling conditions of the surfaces of the specimen.

The non-uniform distribution of temperature, as per (c), influences the generation of heat by hysteresis locally, but this is not very important as the relation

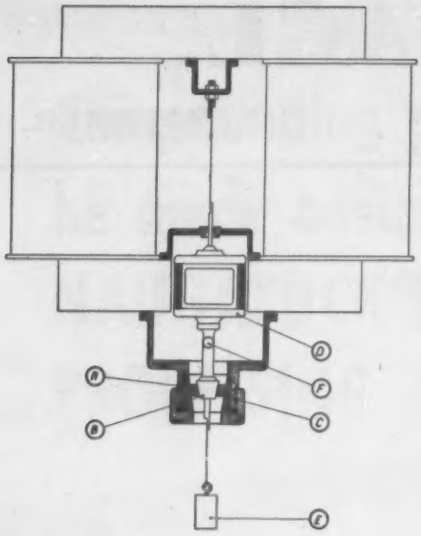

FIG. 1—Schematic drawing of resonance shear apparatus.

hysteresis-temperature can be determined by laboratory tests.

The rigidity modulus also varies with the temperature, and the stress values therefore depend on the temperature distribution, as in (c). It is however possible in simple cases to solve the general problem by means of approximate methods.

It must be assumed that the form of the stress cycles in service conditions be the same as that applied on the specimens used for the laboratory tests, or that, within certain limits, the form of the cycle shall only slightly affect the energy losses when operating at the same deformation or stress conditions and at the same frequency. Laboratory tests should in any case be carried out with almost sinusoidal cycles.

Laboratory tests should determine the amount of energy converted into heat per cycle and per cubic centimeter of cured rubber as a function of the stress or strain amplitude and temperature.

We will in our considerations refer to shear deformations which are those more easily obtained without causing stress alterations at the points where the sample is fixed. This is also the type of strain most common in normal applications.

The oscillation as a result of the shear stress is perfectly symmetrical on each side of the nil-deformation position, and therefore the elongation and creep phenomena, which are always present in a uni-directional deformation due to compression or elongation, need not be considered.

In this paper we will also give a brief description of some experimental results obtained with a method recently developed for testing rubber specimens by means of periodical tension stresses superimposed to a permanent static elongation. With this method it is possible to provoke symmetric oscillations on each side of the static deformation position, and we think it can be usefully applied for some particular applications.

Let ρ be the shear strain in radians which varies periodically with the frequency f. The quantity of energy converted into heat per unit of volume is

$$W = K(t)\rho^2 f \qquad (1)$$

The quadratic dependence of deformation is generally accepted, and it will be seen that this is met within certain limits. The coefficient K, which varies with the temperature, is therefore the energy dissipated in Joule at a given temperature in a single cycle per cubic centimeter of cured stock with a shear amplitude of one radian. The value of ρ, adopted to calculate the deformation, should not be great enough to become destructive (due to the heat developed and the sharp temperature rise), nor small enough to be insufficient for the evaluation of the heat due to hysteresis.

The following relation between shear stress (kg/sq. cm.) and deformation (radians) is also of fundamental importance:

$$\tau = G(t)\rho \qquad (2)$$

τ being the specific shear stress (kg/sq. cm.) and G the dynamic shear modulus, which is strictly dependent on the temperature. The linear relation, especially for high loaded stocks, is valid only for a first approximation. In this case the value of G is different for $\rho = 0.05$ and $\rho = 0.2$ radians. The different values for G obtained by various experimenters, or by following different methods, can be explained by the different stresses used for the test. In our calculations the value of G will of course be determined by the same deformation as used for the determination of K.

In accordance with the above we will determine the relations of K (t) and G (t) with the hysteresis measuring set in the laboratory. Knowing these relations it is also possible to calculate the energy loss per cycle under constant force instead of constant amplitude. In fact from equation (1) and (2) we have

$$\rho = \frac{\tau}{G} \quad \text{and} \quad W = \frac{K}{G^2}\tau^2 f$$

and calling

$$\frac{K}{G^2} = l \qquad (3)$$

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where l is a new coefficient, also dependent upon the temperature. l at a given temperature is the energy loss in Joule per cubic centimeter for a sinusoidal shear deformation cycle having a maximum load of 1 kg/sq. cm.

Knowing K, G and the calculated value l it is possible in many simple cases to evaluate the hysteresis losses as a function of the applied force or deformation. These data are not sufficient in themselves, however, to evalu-

FIG. 2—Resonance shear apparatus.

ate the temperature distribution due to heat generated by hysteresis, and due consideration should also be given to the thermal conductivity and to the rate of heat dissipation in the surroundings due to radiation and convection. The effect of the thermal conductivity on the temperature rise has not been quantitatively considered in the different flexometer tests (Goodrich and others).

The thermal conductivity is practically the same for common rubber-like polymers and for light loaded stocks, but increases very rapidly in high black loaded stocks. Certain qualities of black confer very high conductivity, and this must be taken into account when estimating the heat generated by hysteresis and in evaluating test results.

Let us now consider a system in which the outside surfaces maintain a constant temperature not influenced by the heat generated within the system. If the heat generated and the thermal conductivity in the sample both double their values when working in temperature equilibrium, then the distribution of temperature will remain the same. In fact the fluxes are linearly dependent on the temperature and conductivity.

When in temperature equilibrium condition it is better to consider the ratio $\frac{K}{\lambda}$ instead of K as the heating factor, as this is in fact an energy loss factor, λ being the thermal conductivity coefficient. For the same reason we will consider the ratio $\frac{l}{\lambda}$ instead of the value l. In order to have homogeneous units as the numerator and denominator of the ratio, being λ measured in thermal units, we will express K and l also in calories instead of dissipated Joules. These two symbols thus take the index q and become Kq and lq, respectively.

In uniformly stressed rubber plates and cylinders, in which the surfaces are maintained at constant temperature, the maximum temperature reached will be fairly proportional to the mean value $\frac{Kq}{\lambda}$. The proportionality would be perfect if Kq and lq were independent of the temperature. In temperature equilibrium condition we therefore have a better approximate evaluation of heat in rubber stocks due to hysteresis if the ratio $\frac{Kq}{\lambda}$ is considered instead of the simple value K.

Test Methods

The two test methods now being used in our Laboratories both employ forced oscillations at resonance. In the first method the rubber sample is submitted to periodical shear stresses in an electrically driven apparatus, and in the second the rubber sample, which is kept in permanent strain, undergoes periodical tension stresses, also in an electrically driven apparatus.

Under normal conditions the deformation amplitudes are generally small, but they become considerably larger when operating at critical resonance condition. Both these methods which employ forced oscillations tuned to resonance to the rubber mass system, have proved to be very practical for the determination of hysteresis losses and dynamic elastic modulus.

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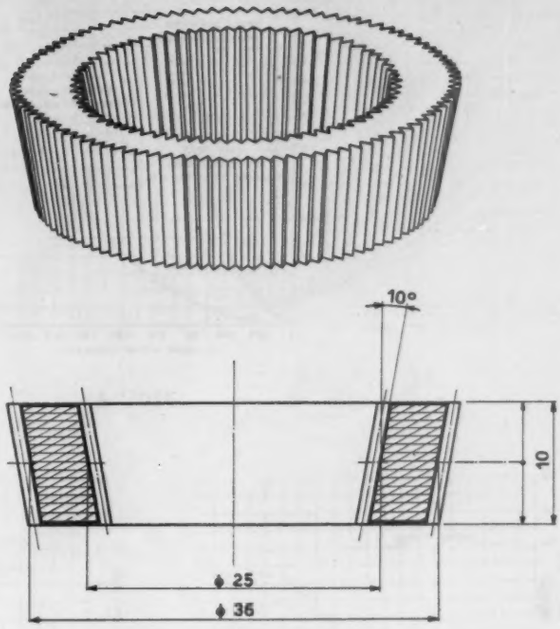

FIG. 3—Test specimen shape.

The rubber sample A has the form of a truncated cone ring and by means of the rotor B is subjected to shear stresses at the desired frequency. This rotor is fixed to the coil D driven electrically in a magnetic field by the current generated from a 50-watt amplifier-oscillator unit of the beat frequency type (range of frequency 0 to 10,000 cycles/sec.). The output impedance of the amplifier has been matched to the impedance of the moving coil, while the sinusoidal character of the current in the coil has been confirmed by means of a cathode ray oscillograph. The frequency of the oscillator can be varied continuously from zero to that desired, a reed type frequency meter being used to measure the frequency up to 125 cycles/sec. Higher frequencies are measured with a frequency bridge. It is possible to obtain resonance conditions at different frequencies with the same rubber samples by simply varying the value of the supplementary weights in the mass system.

The outer and inner surfaces of the rubber sample, which is ring shaped as shown in Fig. 3, are provided with triangular shaped teeth which correspond to similar ones on the rotor B and ring C, as shown in Fig. 1. The sample is thus kept perfectly in position, this being facilitated by its conical shape and by the weight E applied to the rotor; this causes the rotor to adhere tightly to the supporting ring C and gives the sample a static compressive stress of $\sigma_c = 0.04$ kg/sq. cm.

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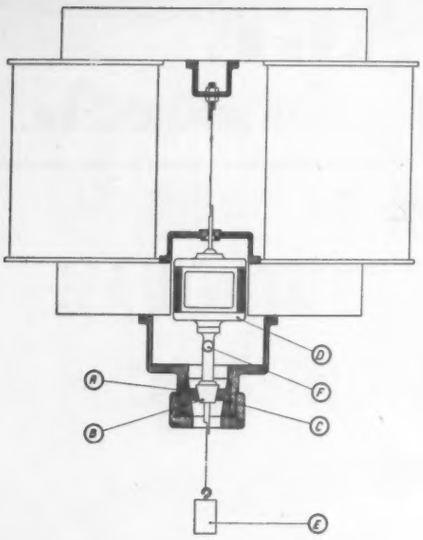

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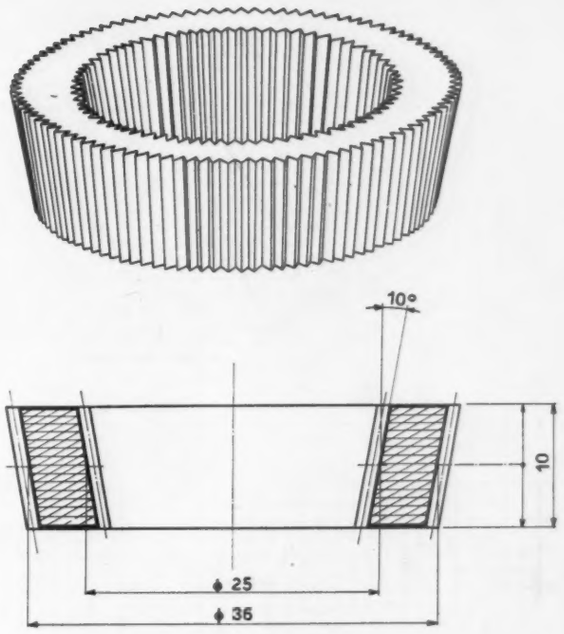

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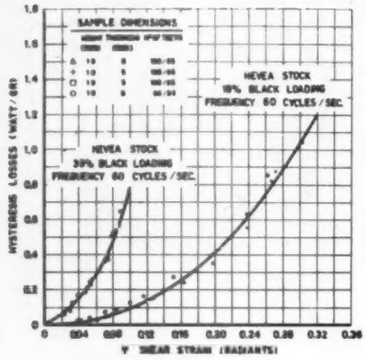
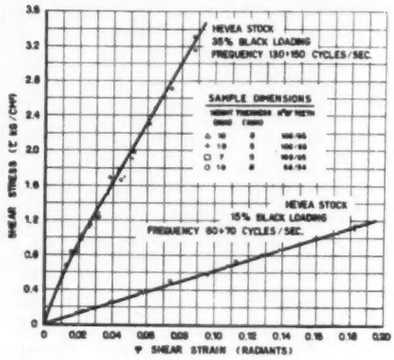


FIG. 4



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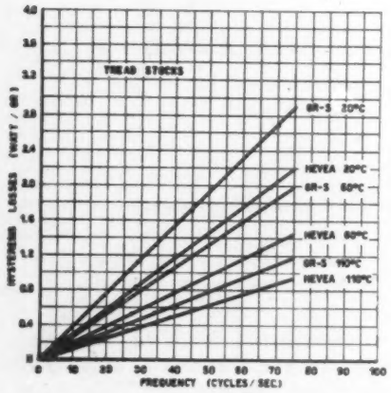

FIG. 6

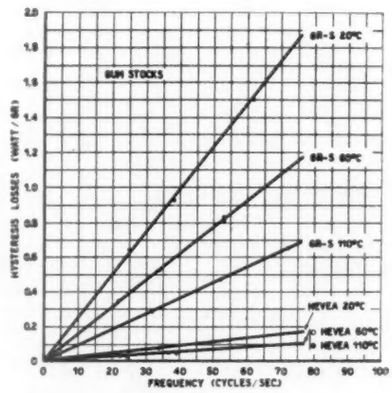

FIG. 7

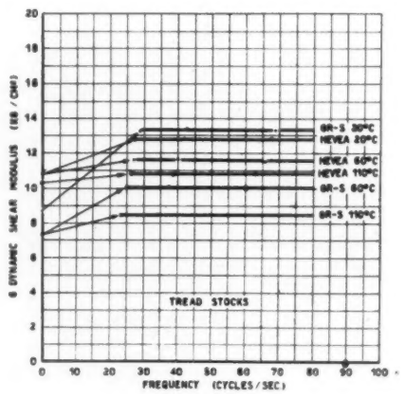

FIG. 8

FIG. 4—Hysteresis losses vs. shear strain with various sample shapes. FIG. 5—Dynamic shear stress vs. shear strain with various sample shapes. FIG. 6—Hysteresis losses vs. frequency of tread stocks. FIG. 7—Hysteresis losses vs. frequency of gum stocks. FIG. 8—Dynamic shear modulus vs. frequency of tread stocks. (Note: Condition of test for Figs. 6, 7 and 8: Dynamic shear strain, 0.2 radians).

Determination of Hysteresis Losses and Elastic Modulus: In an oscillating system such as that indicated above the rubber sample acts as a torsional spring with a spring stiffness $\frac{1}{C}$ (dyne cm/rad.) and a viscous resistance proportional to the rotating speed, b being the constant of proportionality (dyne cm sec/rad). If J is the moment of inertia of the oscillating system (gr. sq. cm), α the rotation in radians, and $\Gamma \cos \omega t$ the impressed momentum* (dyne cm.), where ω is the angular frequency and f the frequency, then we can write the motion equation as follows:

$$\Gamma \cos \omega t = J\frac{d^2\alpha}{dt^2} + b\frac{d\alpha}{dt} + \frac{\alpha}{C} \qquad (1)$$

The solution of this equation, well known in alternating current problems in electricity, is

$$\alpha = \frac{\Gamma \cos\ \omega t\ (\omega t - \theta)}{\sqrt{\left(\frac{1}{C} - J\omega^2\right)^2 + b^2\omega^2}} \quad \text{where } \tan\theta = \frac{b\omega}{\frac{1}{C} - J\omega^2} \qquad (2)$$

Working in resonance amplitude conditions it is

$$\omega^2 = \frac{1}{CJ} - \frac{b^2}{2J} \qquad (3)$$

and equation (2) becomes

$$\alpha_{max} = \frac{\Gamma \cos \omega t\ (\omega t - \theta)}{b\sqrt{\omega^2 + \frac{b^2}{4J^2}}} \quad \text{where } \tan\theta = \frac{2\omega J}{b} \qquad (4)$$

When $\frac{b}{2J}$ is much less than 1, as in our case, equation (4) is reduced with small error to

$$\alpha_{max} = \frac{\Gamma \sin \omega t}{b\,\omega} \quad \text{where } \alpha_{max} = A_{max} \cos \omega t$$

Under these same conditions equation (3) becomes very nearly

$$\frac{1}{C} = J\omega^2 \qquad (5)$$

The energy losses through heat, i.e., the hysteresis losses H, can be calculated as follows:

$$H = f\int_0^{\alpha} b\frac{d\alpha}{dt}\,d\alpha \quad \text{erg/sec}$$

* The impressed momentum is measured by the current passing through the coil and the relation between momentum and current is determined by calibration with direct current or by means of applied weights.

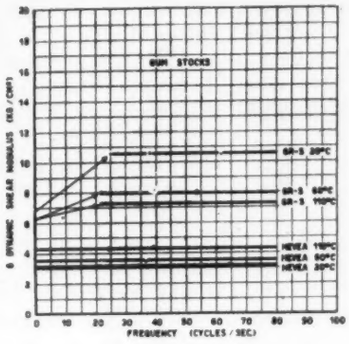

FIG. 9

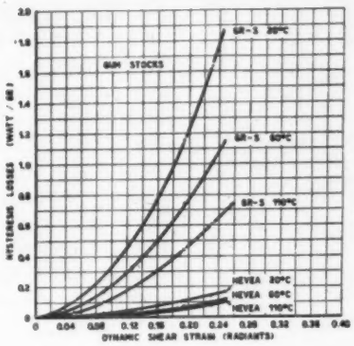

FIG. 10

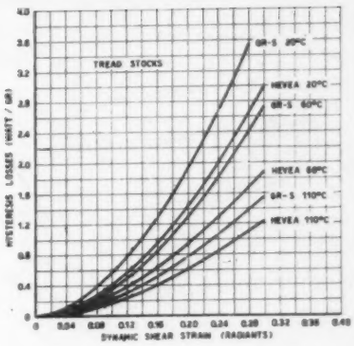

FIG. 11

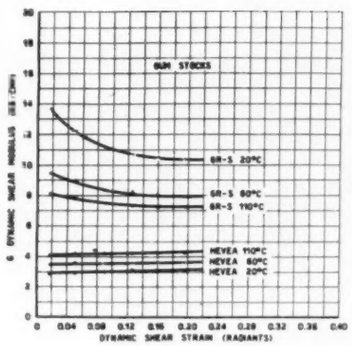

FIG. 12

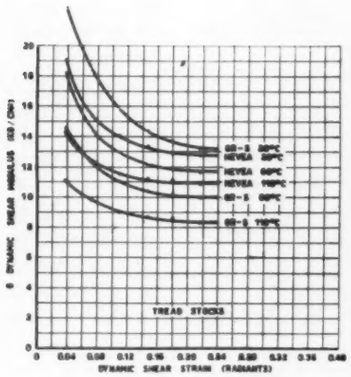

FIG. 13

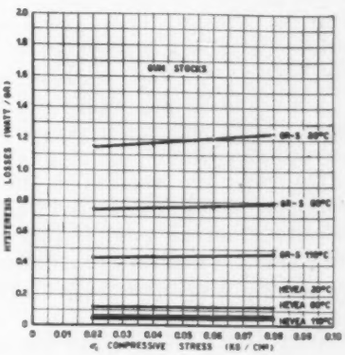

FIG. 14

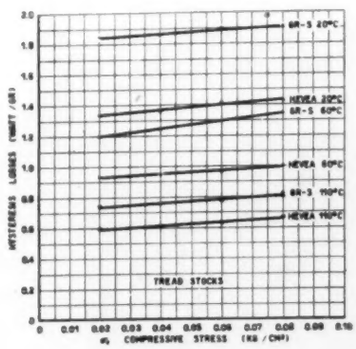

FIG. 15

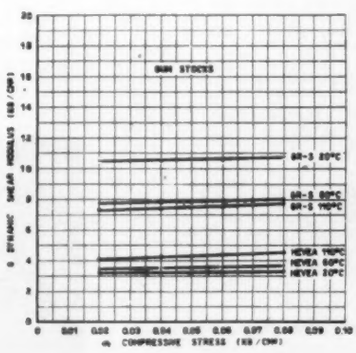

FIG. 16

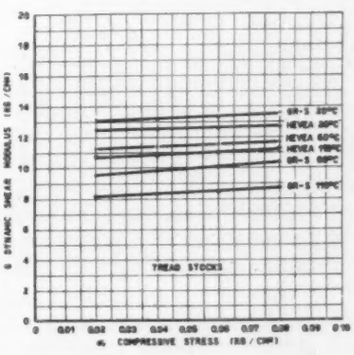

FIG. 17

FIG. 9—Dynamic shear modulus vs. frequency of gum stocks. FIG. 10—Hysteresis losses vs. dynamic shear strain of tread stocks. FIG. 11—Hysteresis losses vs. dynamic shear strain of gum stocks. FIG. 12—Dynamic modulus vs. shear strain for gum stocks. FIG. 13—Dynamic modulus vs. dynamic shear strain for tread stocks. FIG. 14—Hysteresis losses vs. compressive stress of gum stocks. FIG. 15—Hysteresis losses vs. compressive stress of tread stocks. FIG. 16—Dynamic modulus vs. compressive stress of gum stocks. FIG. 17—Dynamic modulus vs. compressive stress of tread stocks. (Note: Condition of test for Figs. 9, 16 and 17—Dynamic shear strain, 0.2 radians; for Figs. 10 and 11—Frequency, 50 cycles/sec.; for Figs. 14 and 15—Dynamic shear strain, 0.2 radians, Frequency, 50 cycles/sec.)

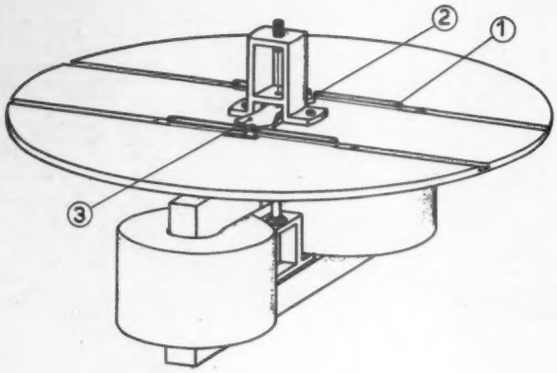

FIG. 18—Drawing of resonance tension test apparatus.

and solving

$$H = \frac{\Gamma \omega A_{max}}{2} \quad 10^{-7} \text{ Watt}$$

where A max. is the maximum deflection of the coil in radians. Dividing H by the weights (grams) or by the volume (cubic cm.) of the rubber sample, we obtain the watt/gr. or watt/c.c. losses.

To calculate the elastic modulus it is necessary to know the driving momentum; this differs from the impressed momentum which only compensates the energy losses due to hysteresis. Equation (3), valid in resonance conditions, provides a direct method for the determination of the driving momentum. In fact by knowing J (moment of inertia of the coil-rotor system), and measuring ω, and by calculating the spring stiffness $\frac{1}{C}$ ($\frac{\text{dyne. cm.}}{\text{rad.}}$) by means of equation (5), and knowing the maximum amplitude of rotation A max. (radians), we can also calculate the maximum value of the driving couple applied to the sample $\frac{\text{A max.}}{C}$.

From the value of the driving momentum it is possible to calculate the mean tangential specific stress which, referred to the strain, gives the dynamic shear elastic modulus G. When calculating the specific stress mean values are taken which, considering the size of the sample, differ very little from the maximum or minimum values.

To check the accuracy of the determination, we have made tests on various samples of the same stock, the height and thickness being different in each case, as well as the number and dimensions of the teeth. The results obtained, within the limits of accuracy of the test method, have been practically the same in all cases, and demonstrate that with our test method the modulus G and the energy losses do not depend on the shape of the sample.

Figs. 4 and 5 show respectively energy loss (watt/gr.) and dynamic shear stress versus dynamic strain for two Hevea stocks with different black loading, and with specimens of various shapes and dimensions of teeth, as indicated above. Other special experiments have been made to investigate the effects of the variation in physical parameters, and include the measurement of the dynamic properties with varying frequency, static compressive stress, dynamic strain and temperature.

The variation of hysteresis losses at constant dynamic strain and temperature increases proportionally with the frequency, as shown in Figs. 6 and 7. The dynamic shear modulus G of Hevea and GR-S gum and tread stocks is seen to be independent of frequency in the range of 20 to 100 cycles/sec. (see Figs. 8 and 9.) Values of the static modulus are also plotted in Figs. 8 and 9, and they are generally lower than the dynamic modulus.

The hysteresis losses at constant frequency and temperature seem to follow the quadratic law versus dynamic shear strain, especially for low loaded stocks (see Figs. 10 and 11). With tread stock the hysteresis losses are found to be lower than would be the case with the quadratic law.

The dynamic modulus G for Hevea gum stock at constant temperature is independent of dynamic shear strain up to a dynamic deformation of 0.2 radians (see Fig. 12). This is not exactly true for GR-S gum stocks and for tread stocks where an increase in dynamic strain produces a decrease in modulus, especially at low temperatures (see Figs. 12 and 13). The variation of dynamic modulus due to application of a static compressive strain, which with other methods of the shear type is very great, is practically inexistent with our method.

Figs. 14, 15, 16 and 17 give the results of dynamic modulus and hysteresis loss measurements on different gum and tread stocks with various static compressive stresses from 0.02 to 0.08 kg/sq. cm. The fact that with our method the modulus and energy losses are independent of the static compressive stress is an important advantage when comparing it with other shear methods, according to which it is necessary to use high static compressive stress normal to the applied dynamic shear stress to avoid slippage during test, or to cement the rubber specimens to the platens, which procedure does not meet the requirements of practical tests. When applying high static compressive stress the modulus depends a good deal on the compressive stress. With our conical ring shaped specimen, in which the two stressed surfaces are continuous, the non-uniform static stress distribution occurring in samples where the two stressed surfaces are discontinuous is eliminated.

With our method, which is independent of static compressive stress*, it is therefore possible to measure the real simple shear modulus.

The effect of temperature on dynamic modulus and energy losses can be seen from Figs. 6 to 13. We have generally found that with a temperature increase there is a lower modulus and a lower energy loss.

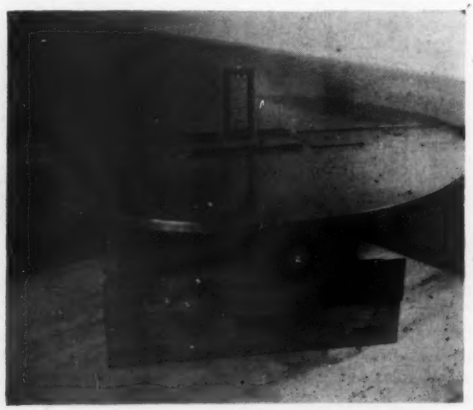

FIG. 19—Resonance tension test apparatus.

* The compressive stress used for our tests is 0.044 kg./sq. cm.

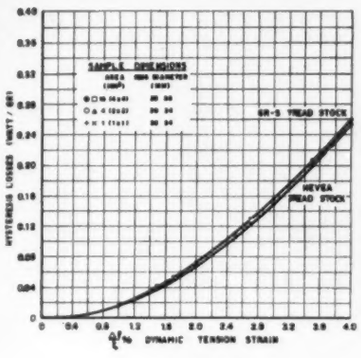

FIG. 20

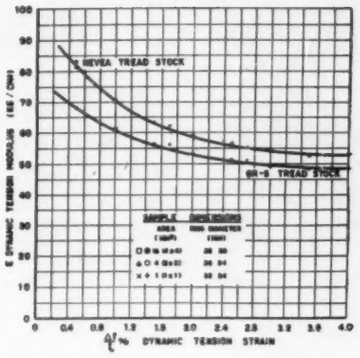

FIG. 21

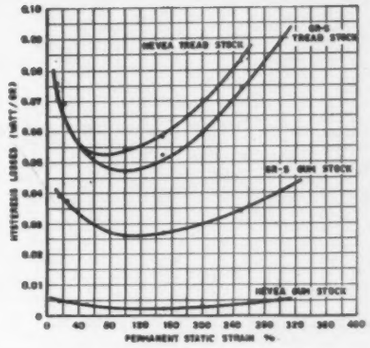

FIG. 22

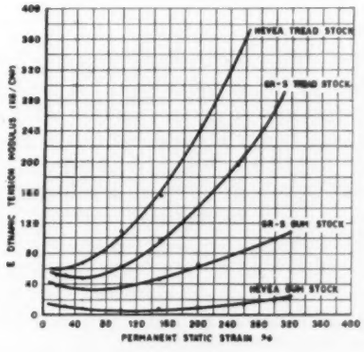

FIG. 23

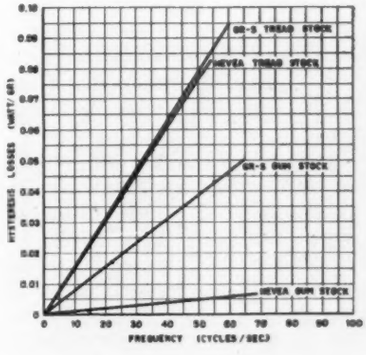

FIG. 24

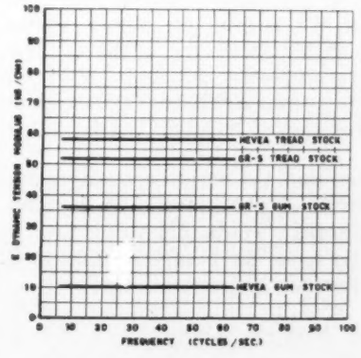

FIG. 25

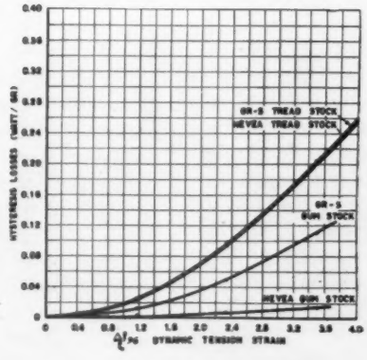

FIG. 26

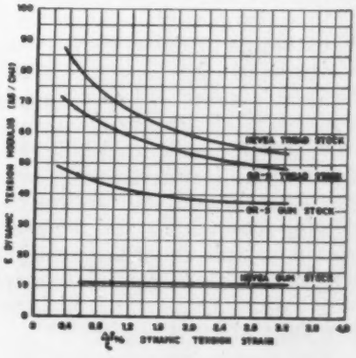

FIG. 27

FIG. 20—Hysteresis losses vs. tension strain with various sample shapes. FIG. 21—Dynamic modulus E vs. tension strain with various sample shapes. FIG. 22—Hysteresis losses vs. permanent static strain for tread and gum stocks. FIG. 23—Dynamic modulus E vs. permanent static strain for tread and gum stocks. FIG. 24—Hysteresis losses vs. frequency of gum and tread stocks. FIG. 25—Dynamic modulus E vs. frequency of gum and tread stocks. FIG. 26—Hysteresis losses vs. dynamic tension strain of gum and tread stocks. FIG. 27—Dynamic modulus E vs. dynamic tension strain of gum and tread stocks. (Note: Conditions of test for Figs. 20 and 21—Temperature of test, 20° C.; Permanent static strain, 15%; for Figs. 22 and 23—Dynamic tension strain, 2%, Frequency, 50 cycles/sec.; Temperature of test, 20° C.; for Figs. 24 and 25—Dynamic tension strain, 2%, Permanent static strain, 15%, Temperature of test, 20° C.; for Figs. 26 and 27—Frequency, 50 cycles/sec., Permanent static strain, 15%, Temperature of test, 20° C.)

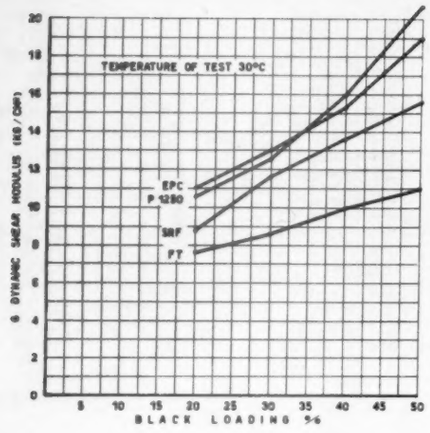

FIG. 28

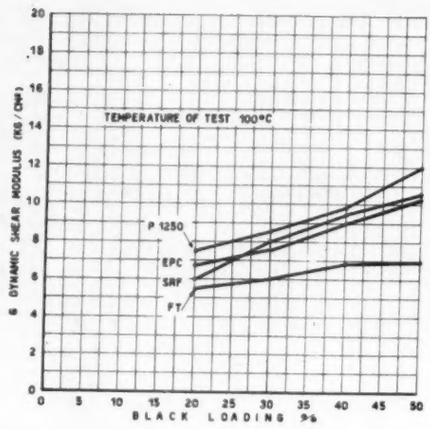

FIG. 29

FIGS. 28 and 29—Dynamic shear modulus vs. black loading of different GR-S stocks, at temperatures indicated.

Tension Test Method: The apparatus now being used in the Pirelli Research Laboratories for the tension test is shown schematically in Fig. 18, and a photograph illustrating same in Fig. 19.

The four rubber samples A are of the ring type, as used in the Schopper dynamometer test, and are maintained in a permanent strain of the desired value by means of the grooved pins indicated by 1 and 2 (see Fig. 18). Pins 1 are movable and can be set at any position to elongate the specimens as desired, from 0 to 500%. Pins 2 are set on the cross-arm 3 which is fixed to the coil driven electrically in a magnetic field by the current generated from an amplifier-oscillator unit of the beat frequency type, already described. Periodical tension stresses can in this way be superimposed with perfect symmetry on each side of the static deformation position of the specimen. Resonance conditions can be obtained at different frequencies either by changing the size of the specimen or by using the same rubber sample and adding supplementary weights to the mass system. Deformation amplitudes are read on a transparent scale, as described in the shear test method.

It is also possible to measure the static elastic modulus E by means of direct current or by applying a couple of weights to the system. For the determination of hysteresis losses and elastic modulus we follow the same method as described for the shear test method. The only difference is in the determination of the dynamic tension elastic modulus E, for which it is necessary to calculate the specific tension stress from the measured driving momentum, and the corresponding tension strain on the sample from the rotation of the cross-arm. To check the accuracy of the determination we have made tests with samples of different shapes and varying lengths and cross section.

The results reported in Figs. 20 and 21, where different types of points are employed for different shaped samples, show that the dynamic modulus E* and the hysteresis losses are independent of the shape of the sample. Figs. 22 and 23 give the hysteresis losses and dynamic tension modulus E at constant dynamic strain and temperature as a function of the static permanent deformation for Hevea and GR-S gum and tread stocks.

The hysteresis losses decrease rapidly with the static permanent strain down to a minimum value corresponding to a static elongation of 110-130% for gum stocks and 70-90% for tread stocks. When this minimum has been reached, then the losses rise rapidly with increasing static permanent strain. The dynamic modulus E (Fig. 23) behaves similarly, but the minima drop to lower values corresponding to a static deformation of 80-120% for gum stocks and 20-50% for tread stocks.

In Figs. 24 and 25 we report the hysteresis losses, dynamic modulus versus frequency at constant dynamic tension strain, permanent static strain and temperature for GR-S gum and tread stocks. The hysteresis losses increase proportionally with frequency, while the dynamic modulus remains constant, as in the shear tests. Figs. 26 and 27 show the relation of the hysteresis losses and dynamic modulus versus dynamic tension strain at constant frequency, static permanent strain and temperature for Hevea and GR-S gum and tread stocks. The hysteresis losses seem to follow the quadratic law, while the dynamic modulus remains constant for Hevea gum stock but decreases very rapidly with increasing dynamic tension strain for Hevea tread and GR-S tread and gum stocks.

It is of interest to note that the ratio between E and G is about 3 for both gum and tread stocks when calculated from the dynamic tests. With this value the coefficient m in the Poisson equation becomes equal to 2, as found with other methods.

The ratio $\frac{G}{E}$ therefore becomes about $\frac{1}{3}$.

Application of Hysteresis Measurements

The Effect of Black Loading on GR-S Compounds: The effect of black loading on GR-S compounds has been studied by preparing compounds containing different percentages of black of various qualities. The types chosen for the comparison are the following: EPC, SRF, FT, P.1250, which are few in number but representative of totally different qualities.

* In all our tests the value of E has been calculated as follows:—

$$E = \frac{F/so}{\Delta l/lo}$$

where

F = the actual force in kg.
so = the original unstrained cross section in sq. cm.
Δl = the actual elongation in cm.
lo = the original unstrained length in cm.

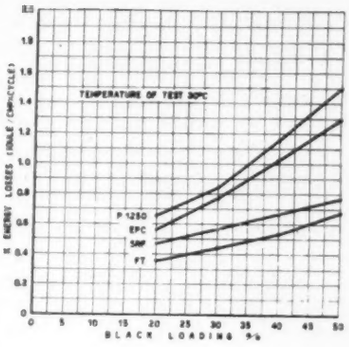

FIG. 30

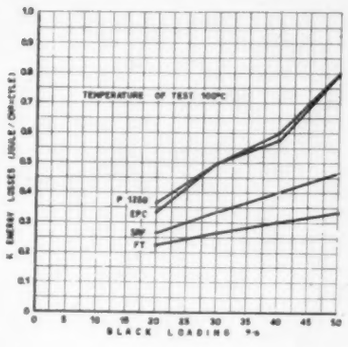

FIG. 31

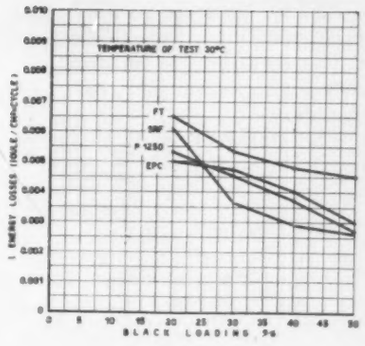

FIG. 32

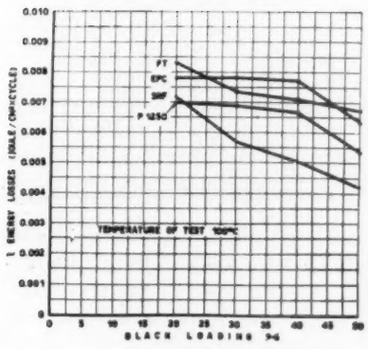

FIG. 33

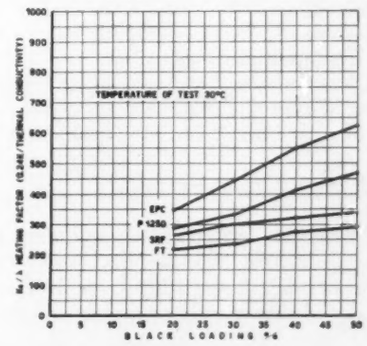

FIG. 34

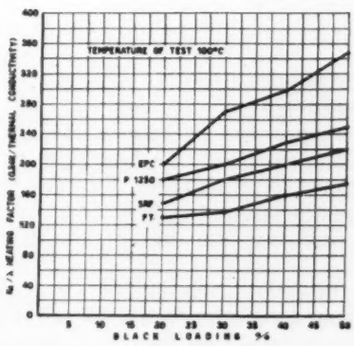

FIG. 35

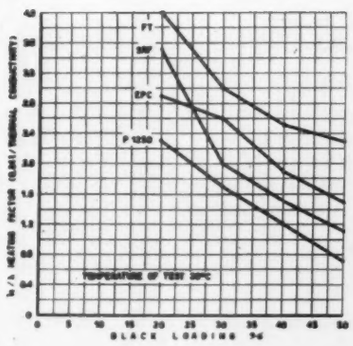

FIG. 36

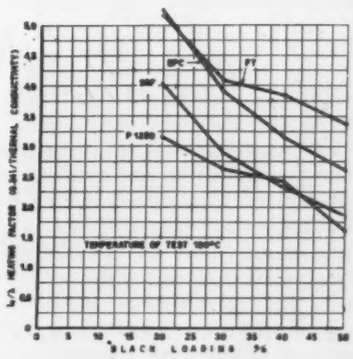

FIG. 37

FIGS. 30 and 31—Energy loss at constant strain K vs. black loading for different GR-S stocks. FIGS. 32 and 33—Energy loss at constant force I vs. black loading for different GR-S stocks. FIGS. 34 and 35—Heating factor at constant strain $\frac{Kq}{\lambda}$ vs. black loading for different GR-S stocks. FIGS. 36 and 37—Heating factor at constant force $\frac{Iq}{\lambda}$ vs. black loading for different GR-S stocks. (Note: Temperatures of tests are indicated on graphs.)

P.1250 black is of German production, its characteristics being between those of HMF and EPC blacks. It has considerable hardening properties and confers a very high electric and thermal conductivity to the compounds.

The composition of the compound used for the test (parts by weight) is given in Table I below:

TABLE NO. 1

Standard GR-S	100.0
Mercaptobenzothiazole	0.7
Diphenylguanidine	0.8
Zinc Oxide	5.0
Sulfur	1.0
Black	20/30/40/50

Acceleration is very high and the sulfur content correspondingly low, and this reduces the effect of the variable absorbing power versus accelerators of the different blacks used. It has been found possible to keep the cure time uniform at 60 mins. and 143° C. for all compounds.

Figs. 28 to 37 give the experimental values obtained at 30°-100° C., that is, at ambient temperature and at a temperature which should not be surpassed in service conditions for safety reasons. Figs. 28, 29, 30 and 31 show respectively the values of G and K in mechanical units as a function of the black loading.

Besides the G and K values, the calculated value of 1 is given in Figs. 32 and 33 as a function of the black loading. Figs. 34 to 37 give the calculated values of the ratios $\frac{Kq}{\lambda}$ and $\frac{lq}{\lambda}$ still versus black loading.

The coefficient λ has been determined by direct measurement of the thermometric conductivity between 20° and 80° C. and from the calculated specific heat. The same thermal conductivity value has been assumed for the two temperatures 30° and 100° C., owing to the difficulty of making very exact measurements within these limits and the relatively small importance of the correction.

An examination of the results reported in Figs. 28 to 37 illustrate the following:

(a) Figs. 28 and 29 show the considerable decrease in dynamic shear modulus with temperature; this is more marked in highly loaded compounds and with blacks having strong hardening properties.

(b) The energy loss at constant deformation is considerably lower at 100° C. than at 30° C. This is due to the drop in dynamic modulus with increasing temperature and to the loss decrease in percent, owing to the recognized greater resilience at higher temperatures.

(c) The classification of the various blacks is quite different when considering the value K or the ratio $\frac{Kq}{\lambda}$. For instance, the hysteresis loss of P.1250 black is greater than that of EPC black at 30° C., but is the same at 100° C. The greater conductivity of the former, however, results in reduced heating compared with the latter. Practical temperature tests on samples stressed at constant deformation confirm the importance of the effect of conductivity, especially with highly loaded stocks.

(d) The energy loss at constant force decreases with the increase of black loading, the rate of this decrease being different for relatively rough blacks, such as SRF and FT, than for finer and active blacks like P.1250 and EPC.

With this type of stress (constant force) P.1250 seems to be the best from the point of view of the temperature rise, but this is not equally true when considering only the energy losses.

Substantially similar results are obtained also with GR-S rubber, less accelerated compounds being used with sulfur content of 1.7%. The added sulfur does not alter the classification of the blacks, and leaves the absolute hysteresis values practically unchanged.

ACKNOWLEDGMENT

The authors wish to thank Dr. L. Emanueli, to whom is due the principle of the test methods indicated above, and who also directed all the research work in this field. The permission of the Pirelli Company to publish these results is also greatly appreciated.

(EDITOR'S NOTE: An article on the "Measurement of Hysteresis and Dynamic Elastic Modulus of Textile Yarns and Cords," by G. Palandri, will be published in our next issue. The few known test methods employed for such measurements are reviewed and a new test method based on forced resonance oscillation, similar to that described in the present article, is described.)

Rubber Statistics for the United Kingdom

CONSUMPTION of new rubber in the United Kingdom for the first six months of 1948 amounted to 99,979 long tons, as compared with 70,542 tons in the corresponding 1947 period, according to the U. S. Department of Commerce. Since highest consumption for a calendar year was 156,549 long tons in 1941, a figure almost equaled by the 156,399 tons reported in 1947, a new record will evidently be set this year.

Of total consumption in the first half of 1948, 98,615 tons, including 5,177 tons of latex, was natural. The remaining 1,364 tons consisted of 371 tons of Buna-S, 733 tons of neoprene, 79 tons of butyl, and 141 tons of N-type. Reclaim consumption amounted to 12,727 tons.

Consumption of natural rubber amounted to 49,838 tons in the first quarter of 1948, and 48,777 tons in the second quarter. Consumption of Buna-S declined from 209 tons to 162 tons, and butyl from 49 to 30 tons. Consumption of neoprene, however, increased from 375 tons to 398 tons, and N-type from 66 to 75 tons. Reclaim declined from 6,517 to 6,210 tons.

Imports of natural rubber in the half year totaled 112,667 tons, and exports amounted to 10,103 tons. Total imports of synthetic rubber during the period amounted to 1,258 tons. The breakdown for June is not yet available, but in the first 5 months of the year 47 tons of Buna-S, 948 tons of neoprene, and 146 tons of N-type were imported.

Reclaim production in the period was 12,837 tons—110 tons more than estimated consumption. In the first 5 months of the year 841 tons of reclaim were exported.

Stocks at the end of June were, in long tons, as follows: Natural 135,772 (including 2,479 tons of latex), Buna-S 676, neoprene 638, butyl 542, N-type 248, and reclaim 3,957. At the end of December 1947, stocks, in the same order, (in long tons) were: 127,160 (1,537), 997, 203, 622, 203, and 4,334. Government stocks of natural rubber declined 2,633 tons during the half year, whereas manufacturers' and dealers' stocks increased by 11,245 tons.

Chlorostyrene Polymers with Butadiene

By H. C. JONES

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DURING the past few years a large number of GR-S type development polymers have been subjected to a systematic evaluation in stocks pigmented with zinc oxide. Some of these polymers have exhibited distinctly superior physical properties to standard GR-S when pigmented with zinc oxide or other non-carbon fillers. A low fatty acid GR-S polymer, X-214, a slightly lower temperature (104°-113°F.) polymerized product than standard GR-S, and several high molecular weight polymers have shown considerable promise. The high Mooney viscosity of the latter materials, however, is a disadvantage from the standpoint of processability. In more recent tests several chlorostyrene modifications of the butadiene-styrene polymers have been noteworthy in developing tensile properties with non-carbon pigments that heretofore have been attained in GR-S compounds only with channel blacks.

One of the outstanding dichlorostyrene polymers was XP-8* and the results with this polymer compared with standard GR-S in a stock pigmented with 100 parts of XX-166† zinc oxide are shown in Table I. The ultimate tensile strength of 3200 p.s.i. is the highest value that has been obtained in our laboratory for any GR-S type synthetic rubber pigmented with zinc oxide or other non-carbon pigment. The tear resistance at room temperature and 100°C. and the cut-growth resistance of this development polymer are distinctly better than that of standard GR-S. The pendulum rebound of XP-8 is

* All XP polymers except XP-8N described herein made for the Office of Rubber Reserve at the Government Laboratories, University of Akron, Akron, Ohio. XP-8N made by the Mathieson Chemical Company. These polymers will not be in regular production in the near future, although limited samples could be made available for evaluation when existing inventories permit upon request to the Research and Development Division, Office of Rubber Reserve, Reconstruction Finance Corporation, Washington 25, D. C.

† The designation of this propionic acid-treated zinc oxide has been changed to Protox-166.

TABLE I—A COMPARISON OF THE BUTADIENE-DICHLOROSTYRENE POLYMER, XP-8 WITH GR-S
(Original Results)

FORMULA

Polymer	100.0
Sulfur	2.5
El-Sixty	1.5
Monex	0.2
Coumarone-indene resin	7.5
E.L.C. Magnesia	5.0
Zinc Oxide	100.0

Identification	Time of Cure Min. at 45 Lb.	Tensile Strength (p.s.i.)	Per Cent Elongation	Modulus Load (Lb./Sq. In.) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100° C.
XP-8*	4	3100	760	235	275	390	590	.28	50	70	36
	7.5	3200	710	265	305	455	725	.25	51	75	38
	15	3040	690	270	310	460	770	.21	51	75	38
	30	2680	670	270	350	505	775	.20	51	78	39
	45	2580	670	275	350	470	785	.17	51	74	37
	60	2480	640	275	315	470	745	.16	51	78	38
	90	2520	670	270	350	465	700	.16	51	75	39
GR-S	4	1470	610	225	380	530	795	.23	50	65	34
	7.5	1455	590	225	335	525	860	.21	50	62	34
	15	1300	560	230	305	495	800	.19	50	60	32
	30	930	510	235	350	545	855	.13	50	57	31
	45	1115	535	230	345	540	845	.14	50	55	29
	60	1195	550	225	335	485	825	.15	50	56	29
	90	1130	540	265	340	490	865	.14	50	55	30

Identification	Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum Indentation in mm.	Per Cent Rebound	Shore Hardness	Compression Fatigue (Goodrich Flexometer) †: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise ° C.	Dynamic Compression Initial	Final	Cut-Growth Resistance Tested at 70° C. Inches 300 Cyc.	Failure 1000 Cyc.
XP-8	60	7.47	60.6	51	25.7	15'-2.9	31.6	15.4	17.9	.34	.78
GR-S	60	7.64	61.2	49	27.5	18'-4.8	36.8 (At 15'-35.4)	18.1	23.0	.52	—

* XP-8 is a 70 butadiene-30 dichlorostyrene monomer, activated with low soap; sulfole DDM mixture; polymerization temperature, 95° F.; Mooney plasticity, 69.

† Test conditions: 143 lb. load; 0.175 in. stroke; 100° C. oven temperature.

Table II—Evaluation of the Butadiene-Monochlorostyrene Polymer, XP-36C

Formula

Polymer	100.0	Coumarone-indene resin	7.5
Sulfur	3.5	E.L.C. Magnesia	5.0
MBTS	1.0	Zinc Oxide	100.0
DPG	0.1		

Identification	Time of Cure Min. at 45 Lb.	Tensile Strength (p.s.i.)	Per Cent Elongation	Modulus: Load (Lb./Sq. In.) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100° C.
XP-36C *	7.5	1780	800	160	240	275	395	.31	47	53	35
	15	2500	720	240	275	435	750	.42	52	62	38
	30	1800	605	240	360	520	920	.33	53	60	35
	45	1560	580	240	360	560	1000	.30	54	59	35
	60	1700	575	275	395	595	1150	.30	54	59	35
	90	1530	550	275	430	665	1255	.27	54	57	35
GR-S	7.5	40	1435	40	40	40	40	1.56	30	13	5
	15	1980	770	190	230	305	455	.33	46	50	33
	30	2040	650	235	275	430	705	.36	50	50	33
	45	1190	560	200	315	435	750	.23	51	53	35
	60	1230	560	240	315	475	790	.25	52	50	33
	90	1570	580	235	315	470	860	.28	52	53	35

Identification	Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer) †: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise ° C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C.: Inches 400 Cyc.	Failure 1600 Cyc.
XP-36C	60	7.66	64.4	53	56	24.3	35'-17.3	39.0 (At 15'-30.5)	15.1	28.3	.25	.75
GR-S	60	7.90	63.8	50	53	27.2	82'-35.8	85.4 (At 15'-27.5)	18.9	43.5	.45	.73

* XP-36C is a 71 butadiene-29 monochlorostyrene monomer, emulsified with fatty acid soap; salt acid coagulation; 62 Mooney; PBNA stabilizer.
† Test conditions: 143 lb. load; 0.175 in. stroke; 100° C. oven temperature.

Table III—Comparison of the Butadiene-Dichlorostyrene Polymers, XP-40A and XP-42

Formula

Polymer	100.0	Coumarone-indene resin	7.5
Sulfur	3.0	E.L.C. Magnesia	5.0
MBT	2.0	Zinc Oxide	100.0
DPG	0.1		

Identification	Time of Cure Min. at 45 Lb.	Tensile Strength (p.s.i.)	Per Cent Elongation	Modulus: Load (Lb./Sq. In.) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100° C.
XP-40A *	2	2520	870	125	170	250	380	.32	46	—	—
	4	2650	770	200	275	395	635	.37	49	80	40
	7.5	2940	730	240	320	485	810	.42	50	79	40
	15	2960	670	280	400	600	1040	.43	51	77	40
	30	2700	620	285	450	690	1310	.40	53	77	39
	45	2780	615	285	445	685	1290	.37	54	80	40
	60	2620	600	285	445	810	1330	.35	54	86	41
	90	2620	595	315	475	790	1350	.32	54	82	45
XP-42 **	2	2060	830	130	215	300	470	.34	45	—	—
	4	1940	695	235	350	505	775	.34	48	78	41
	7.5	2180	680	240	315	515	870	.42	50	76	42
	15	2140	620	285	360	645	1090	.43	52	74	40
	30	2040	575	280	440	680	1280	.40	53	77	36
	45	2060	570	240	445	725	1330	.40	53	77	36
	60	1940	560	285	485	765	1370	.36	53	74	37
	90	1530	525	285	445	725	1290	.29	53	76	35

Identification	Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum: Indentation in mm.	Per Cent Rebound	Hardness: Shore	Rex	Compression Fatigue (Goodrich Flexometer) †: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise ° C.	Dynamic Compression: Initial	Final	Cut-Growth Resistance Tested at 70° C.: Inches 400 Cyc.	Failure 1500 Cyc.
XP-40A	60	7.51	60.9	52	55	24.3	15'- 5.3	22.1	13.6	16.0	.15	.26
XP-42	60	7.49	60.2	52	55	25.4	55'-27.3	61.0 (At 15'-37.0)	16.1	37.2	.16	.30

* XP-40A is a 70 butadiene-30 dichlorostyrene copolymer having a 57 Mooney, prepared by using the XP-8 recipe (low temperature—95° F.—polymerization).
** XP-42 is a 71 butadiene-29 dichlorostyrene copolymer having a 56 Mooney, prepared according to the standard GR-S formula.
† Test conditions: 143 lb. load; 0.175 in. stroke; 100° C. oven temperature.

TABLE IV—EXPERIMENTAL BUTADIENE-CHLOROSTYRENE POLYMERS
(Original Results)

FORMULA

Polymer	100.0
Sulfur	3.0
MBT	2.0
DPG	0.1
Coumarone-indene resin	7.5
Extra-light calcined magnesia	5.0
XX-166	100.0

Identification	Time of Cure Min. at 45 Lb.	Tensile Strength (p.s.i.)	Per Cent Elongation	Load (Lb./Sq. In.) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness
XP-36C [1]	4	2020	740	210	295	420	590	.36	50
	7.5	2220	700	210	300	425	680	.38	51
	15	1700	570	255	380	635	1110	.32	53
	30	1600	560	240	360	560	1040	.30	54
	45	1610	550	255	380	635	1110	.30	55
	60	1630	560	245	365	570	1020	.29	55
	90	1940	600	250	370	620	990	.30	55
XP-8N [2]	4	2490	790	215	300	385	515	.44	50
	7.5	2540	715	215	300	470	770	.45	52
	15	2340	625	260	390	650	1170	.42	54
	30	2600	625	300	425	680	1320	.41	55
	45	2580	595	300	470	730	1370	.40	55
	60	2320	560	285	450	735	1350	.33	56
	90	2800	600	330	455	700	1440	.37	56
XP-42 [3]	4	2150	830	130	215	300	470	.45	48
	7.5	2360	730	205	285	405	690	.49	50
	15	1870	615	215	305	520	960	.40	52
	30	1555	560	250	380	590	1050	.34	53
	45	2060	600	260	385	645	1160	.40	54
	60	1840	580	250	380	630	1090	.37	54
	90	1940	600	250	380	590	1050	.36	54
XP-40A [4]	4	2760	860	175	220	260	395	.44	47
	7.5	2880	775	170	260	345	515	.44	50
	15	2620	670	260	345	515	860	.42	52
	30	2200	615	285	365	570	1020	.36	54
	45	2190	600	300	385	645	1120	.35	54
	60	2960	640	260	385	560	990	.40	54
	90	2400	620	295	380	590	970	.32	55
X-387 [5]	4	1510	740	205	245	325	490	.32	47
	7.5	1390	635	200	275	435	635	.28	50
	15	1270	550	255	380	555	975	.25	52
	30	1410	550	250	415	625	1040	.26	54
	45	1270	530	255	380	595	1020	.23	54
	60	1290	555	275	350	510	900	.24	54
	90	1335	560	235	350	550	860	.30	54

[1] XP-36C is a 71 butadiene-29 monochlorostyrene copolymer, with fatty acid soap emulsification.
[2] XP-8N is a fatty acid soap emulsification dichlorostyrene polymer.
[3] XP-42 is a 71 butadiene-29 dichlorostyrene copolymer having a 56 Mooney and prepared according to the standard GR-S formula.
[4] XP-40A is a 70 butadiene-30 dichlorostyrene polymer having a 57 Mooney and prepared by the XP-8 recipe (and low temperature polymerization).
[5] X-387 is the standard reference GR-S.

slightly lower than standard GR-S but the heat build-up properties on the Goodrich flexometer are somewhat better.

The compounding information on the butadiene-monochlorostyrene polymer, XP-36C, is reported in Table II. Although the tensile and tear results with XP-36C are somewhat lower than XP-8, the results are generally better than regular GR-S or the other modifications that have been tested. The pendulum rebound for XP-36C is higher than XP-8 but the compound shows more compression fatigue.

The data on more recently developed butadiene-dichlorostyrene polymers, XP-40A and XP-42, are listed in Table III. The former is a 70-30 butadiene-dichlorostyrene polymer in which the polymerization was conducted at a slightly lower temperature (95°F.) than that of XP-42. The polymerization conditions for the latter polymer were approximately the same as those for standard GR-S.

The superior tensile, tear, and resilience of the polymer made by low temperature polymerization is quite apparent and parallels the results that have been obtained by a number of investigators when a low temperature is used for the polymerization of standard GR-S. Both XP-40A and XP-42 had milling properties that were comparable to the best GR-S type polymers. It is worthy of comment that XP-40A had satisfactory processability despite the fact that the polymer was emulsified with a low concentration of soap. Low soap polymers of the conventional butadiene-styrene type are characterized by inferior processing properties.

Other dichlorostyrene modifications have been evaluated and the stress-strain properties of these polymers are shown in Table IV. In this group of tests, XP-40A, XP-42 and XP-36C had ultimate tensiles about equal to those reported in Tables II and III. Stress-strain

TABLE V—EXPERIMENTAL ISOPRENE-STYRENE POLYMERS
(Original Results)

FORMULA

Polymer	100.0
Sulfur	3.0
MBT	2.0
DPG	0.1
Coumarone-indene resin	3.0
Extra-light calcined magnesia	5.0
XX-166	100.0

Identification	Time of Cure Min. at 45 Lb.	Tensile Strength (p.s.i.)	Per Cent Elongation	Load (Lb./Sq. In.) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness
XP-64[1]	4	1070	650	275	355	475	675	.31	45
	7.5	970	500	380	505	715	970	.20	49
	15	935	420	490	655	855	—	.17	52
	30	945	390	535	740	—	—	.15	53
	45	1110	470	495	700	905	—	.21	53
	60	980	420	490	735	935	—	.16	53
	90	1010	470	460	630	840	—	.19	53
XP-65[2]	4	1380	545	405	610	855	1220	.17	49
	7.5	1530	530	510	805	1110	1490	.16	52
	15	1470	385	755	1180	—	—	.12	54
	30	1410	415	665	960	1330	—	.13	54
	45	1405	405	680	1060	1405	—	.11	54
	60	1510	475	590	880	1260	—	.14	54
	90	1510	490	545	840	1180	—	.14	53
XP-66[3]	4	1410	725	210	290	415	625	.23	45
	7.5	1180	565	295	420	630	920	.17	50
	15	1030	415	435	635	990	—	.11	52
	30	1280	530	400	560	800	1080	.16	52
	45	1160	540	345	560	770	1075	.14	51
	60	1160	515	430	600	860	1120	.13	51
	90	1230	575	380	555	765	1020	.14	50
XP-74[4]	4	1180	550	460	590	755	1010	.17	52
	7.5	1120	410	580	830	1080	—	.14	54
	15	1100	335	735	1020	—	—	.12	57
	30	1070	305	780	—	—	—	.09	58
	45	1120	315	750	1000	—	—	.12	58
	60	1195	365	700	1030	—	—	.13	58
	90	1090	360	685	920	—	—	.12	57
GR-S-10[5]	4	590	1085	80	120	155	195	.55	37
	7.5	1310	895	160	200	275	355	.29	41
	15	1220	675	210	335	420	590	.18	46
	30	1130	570	240	360	525	810	.14	48
	45	990	520	260	385	600	860	.12	50
	60	860	475	300	430	600	—	.10	51
	90	1040	515	305	435	650	960	.11	52

[1] XP-64 is a cross-linked isoprene-styrene divinyl benzene polymer with rosin acid soap emulsification.
[2] XP-65 is the control isoprene-styrene polymer for XP-64-L-1 (no cross-linking agent).
[3] XP-66 is a 90 isoprene-10 dichlorostyrene polymer with rosin acid soap emulsification.
[4] XP-74 is a 100 Mooney modification of XP-64.
[5] GR-S-10 is the standard rosin acid soap polymer.

properties of XP-64, XP-65, XP-66 and XP-74, which are isoprene-styrene polymers and modifications of these rubbers with dichlorostyrene, are listed in Table V.

The control isoprene-styrene polymer, XP-65, had substantially higher stress-strain properties than the other three polymers, which range from 1000 to 1200 p.s.i. in ultimate tensile strength. The characteristic features of the other isoprene-styrene polymers are as follows: XP-64 is similar to XP-65 except that it contains the cross-linking agent, divinylbenzene; XP-66 is a 90-10 ratio isoprene-dichlorostyrene polymer; and XP-74 is a 100 Mooney modification of XP-64. These polymers were emulsified with a rosin acid soap.

The resilience of these polymers over a temperature range of from 0 to 200°C. is charted in Figures 1 and 3. The temperature resilience measurements were made on a Goodyear-Healey pendulum equipped so that the block temperature could be varied at will. The anvil of the pendulum with the attachments for heating and cooling the test block is depicted in Figure 5. The back and sides of the test samples are heated by electric coil heaters inserted in drilled channels in the cast iron anvil and in the steel block mounted on the face of the anvil. The assembly is cooled by cold water circulating through channels in the anvil.

All of the butadiene-dichlorostyrene polymers had inferior resilience properties to regular GR-S in the range between 0°C. and 40°C. The monochlorostyrene modification, XP-36C, was appreciably better in resilience than the dichlorostyrene polymers in this temperature range. The lower temperature polymer, XP-40A, had measurably higher resilience properties than the other polymers above 40°C. The dichlorostyrene polymer, XP-8N, showed the lowest resilience properties at 0°C. The curve rises rapidly, however, and this polymer gave high values at temperatures above 100°C.

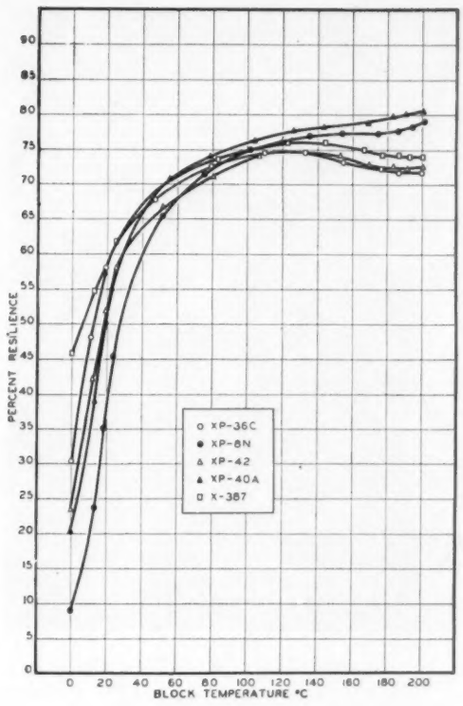


FIG. 1—Resilience determinations on butadiene-chlorostyrene polymers compared with Standard GR-S.

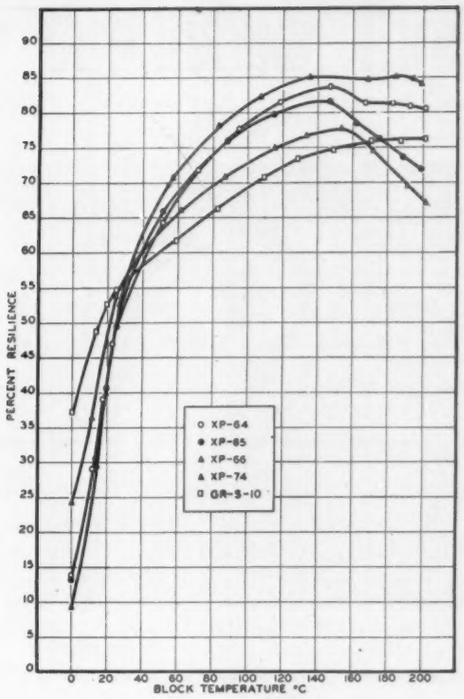


FIG. 3—Resilience determinations on isoprene-styrene polymers compared with GR-S-10.

A limitation of the chlorostyrene polymers that is frequently mentioned is the poor performance of these rubbers at low temperatures. In the determination of pendulum resilience, a dynamic hardness measurement is obtained and these results are reported in Figures 2 and 4 as the indentation or penetration of the pendulum hammer into the test block. The indentation values suggest that the butadiene-dichlorostyrene polymers other than XP-8N have dynamic hardness properties in the range of X-387-GR-S*.

It seems probable from these observations that pigmentation with zinc oxide minimizes the hardening

* Standard GR-S reference bale from July to December 1947, inclusive.

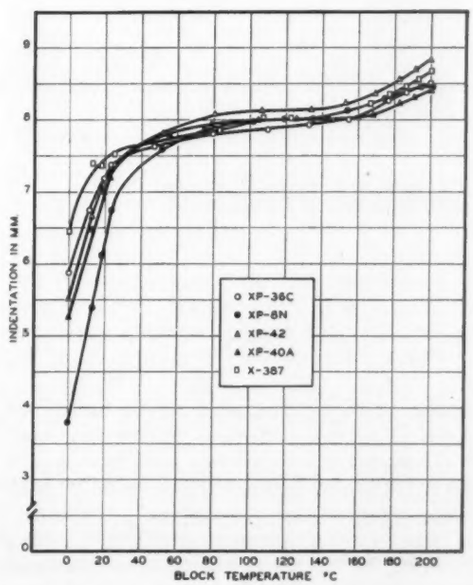


FIG. 2—Dynamic hardness of butadiene-chlorostyrene polymers compared with Standard GR-S.

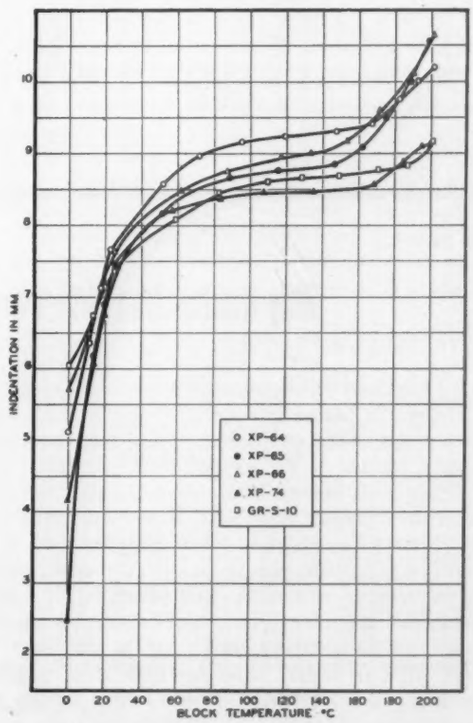


FIG. 4—Dynamic hardness of isoprene-styrene polymers compared with GR-S-10.

TABLE VI—GEL AND VISCOSITY MEASUREMENTS

Polymer	Per Cent Gel *	Viscosity **
XP-36C	1.96	155
XP-8N	36.72	163.6
XP-42	7.28	168.7
XP-40A	4.76	158.5
XP-64	76.60	Not in solution
XP-65	42.64	Not in solution
XP-66	28.92	Not in solution
XP-74	88.08	Not in solution
X-346-GR-S †	1.84	179.2

* The gel determination consists of the room temperature solubility of the polymer in benzene.
** The viscosity index is the efflux time in seconds of a 0.5 per cent solution of the polymer in toluene through a Bingham viscosimeter at 27° C.
† Standard GR-S reference bale.

effect of the chlorostyrene polymers in the range below room temperature. Further evidence in support of this point is the fact that these polymers compared favorably with standard GR-S in the DuPont cold bend test in which the stocks are subjected to a sharp flexing strain at —60° C.

The isoprene-styrene polymers, XP-64, XP-65 and XP-74, had resilience values between 100°C. and 200°C. that were in the range of that of natural rubber. The high molecular weight isoprene-styrene polymer cross-linked with divinylbenzene, XP-74, was particularly noteworthy in this respect. However, the resilience of this group of polymers below 40°C. was very unsatisfactory.

Gel and viscosity determinations on several of the polymers are listed in Table VI. The dichlorostyrene polymer, XP-8, had somewhat higher gel values than the other chlorostyrene polymers XP-36C, XP-40A and XP-42. The viscosity of these polymers is slightly lower than that of X-346-GR-S.* Although the ultimate tensile strength and viscosity values of a butadiene-styrene polymer usually parallel, that is not the case with the chlorostyrene polymer. Butadiene-styrene polymers with much lower ultimate tensile properties than the chloro-styrene-butadiene polymers would have viscosity values in excess of a 200 viscosity index.

* Standard GR-S reference bale from January to June 1947, inclusive.

FIG. 5—Anvil of the Goodyear-Healey Pendulum with attachments for heating and cooling of the pendulum block.

The isoprene-styrene polymers had somewhat higher benzene solubilities than the butadiene-styrene polymers. The high Mooney and cross-linking divinylbenzene modifications of the isoprene-styrene polymers had higher gel values than the control polymer. The isoprene-dichlorostyrene rubber, XP-66, had a lower gel content than the control, XP-65.

This is a progress report on chlorostyrene polymers and the information is offered with the thought that it may attract attention to some useful properties of these materials. If the further studies develop data of interest, a supplementary report will be issued at a later date.

Why Rubber Machinery and Equipment Is Sometimes Troublesome

OPERATORS of rubber machinery and equipment are not always to blame for equipment troubles, as many an operator has often suspected. Take for example such a seemingly simple thing as the flow of water through a pipe. It is well known that when a pipe becomes encrusted with scale, or after its interior is coated with slime, it "resists" water flow more than before. It makes no difference what the pipe is made of—cast iron, steel, brass, gold or even platinum—the effect is the same.

It is logical, therefore, that the basis of computation should be on the coating and not on the material of which the pipe is made. The friction will be the same in all such pipes after the interior is once coated regardless of the pipe. Before the interior is fully coated it is true that there is a difference, but it is evident that where coating occurs the friction created by the coat must be considered and not the friction on the buried material. Yet it is not uncommon for designers to use formulas in which the buried material is specified rather than the coating that is almost sure to build up within the pipe.

The same is true of chimneys, ducts, tubing, etc., commonly used in rubber factories, that become coated during use. Thus, after the chimney's interior is once coated with soot its friction becomes the same as all other chimneys whose interiors are covered with the same kind of soot. It makes no difference whether the chimney is made of brick, concrete, tile, steel, or anything else. Yet we often find formulas that designate different frictions for the various materials of which chimneys, ducts, tubing, etc., are constructed. Obviously, such practice can be improved.

Andal Process for Producing Cut Rubber Thread

PARTICULARS on their newly-developed and patented process for producing cut rubber thread have been released by the Andrews-Alderfer Processing Co., Inc., of Akron, Ohio. Called the Andal Process, this new development is a radical departure from established methods of rubber thread manufacture. The following description of the method is based on data furnished by the company.

In the Andal Process, calendered rubber sheet is cut before vulcanization. This is of major importance, since cutting waste can be remilled and salvaged. Where vulcanized sheet is processed, cutting waste loss is an important factor of material cost. Vulcanization after cutting gives to all four sides of the thread a cured "skin." This adds toughness and insures a smooth finish so important to processors.

From the cutter through the curing oven onto drums the thread production process is automatic. Consequently, labor cost per unit of production is very low.

FIG. 2—Calendered sheet is seen entering the Andal cutter (left foreground). Cutting waste is collected and reworked.

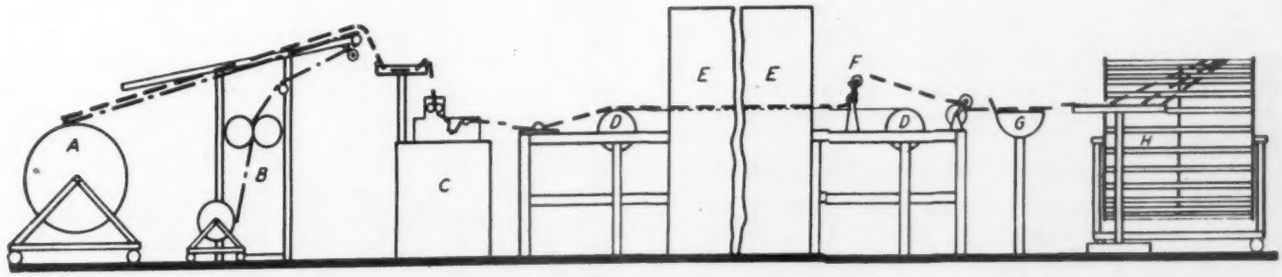
FIG. 1—This 8x16-inch four-roll calender is used for running 9-inch wide sheet at Andrews-Alderfer's pilot plant.

The flow chart shown below does not indicate either the required mills or the calender. A small, inexpensive calender is used. In the company's pilot plant in Akron, a four-roll 8x16-inch calender unit is used (see Fig. 1) which produces a 9-inch wide calendered sheet. Ordinary Kraft paper liners are used. Since these paper liners are used several times, liner cost is very low. Furthermore, finished thread is free from "liner marks."

Long lengths of thread are produced. This is an obvious advantage to thread processors. The calendered sheet on paper liners is taken off in rolls having 500 or more yards per roll (A). Rolls are joined and cutting is continuous.

The paper and unvulcanized sheet are separated ahead of the cutter (see B) with the rubber being fed through a lubricating solution into the Andal cutter, a part of the patented process (see Fig. 2). The meshed multiple discs (C) cut this sheet into from 180 to 260 ends or threads. These cut threads feed onto a specially constructed conveyor belt (D). This special construction is necessary to resist the high temperatures sustained. A glass fiber base is bonded and coated with a high temperature resistant material.

In the pilot plant oven (E), circulated hot air from



Flow Chart of the Andal Thread Process

(A) Calendered stock on paper liners. (B) Paper liner re-wind. (C) Andal cutter. (D) Conveyor main pulley (E) Oven. (F) Thread take-off. (G) Dusting. (H) Drum wind.

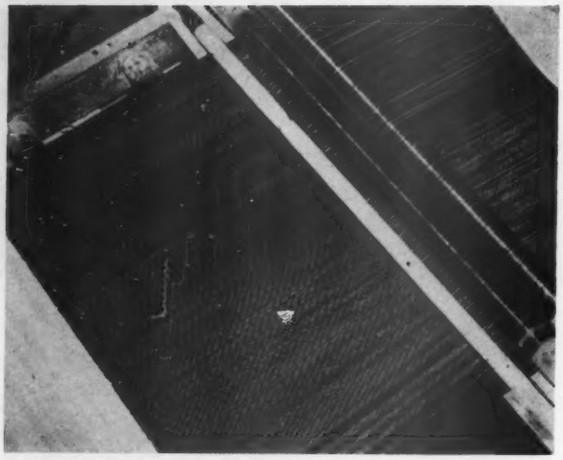


FIG. 3—Finished thread is taken off the special conveyor belt on vertical rollers and then fed through a duster.

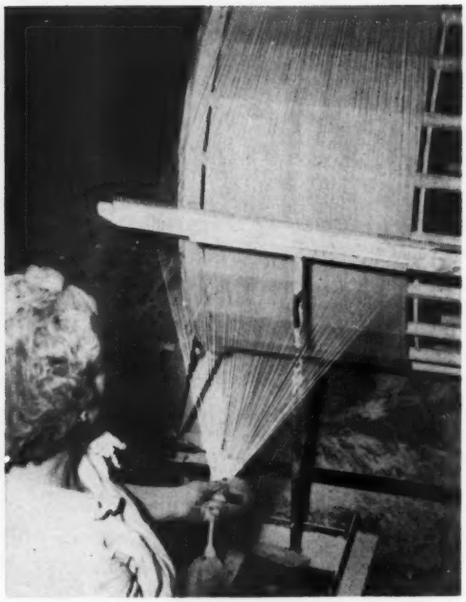


FIG. 4—From the drums, the finished thread is chained. Final inspection is carried out at the same time.

natural gas heaters is used. Other installations under construction, however, will use steam heat. At the other end of the oven the thread is stripped from the belt, as illustrated by (F) in the flow chart. (See also Fig. 3). The vulcanized thread is fed through a dusting mechanism (G) and then directly onto drums or skeiners (H). From the drums the thread is chained (see Fig. 4). The chaining operation permits final inspection by the operator.

The Andal Process is of special interest abroad because a small cut rubber thread plant is practical and efficient. Many countries of the world have a rubber thread demand too small to support the large investment represented by a minimum plant based on former methods. Consequently, these countries have been forced to import. Exchange and other difficulties place a premium on the establishment of local production units.

Andal production units with annual capacities as low as 50,000 pounds of finished thread are being engineered. However, the unit is efficient for production of 300 pounds per day or more and the total plant investment should not exceed $50,000. Of this amount, approximately half is represented by the basic rubber processing machinery—mills and a calender. Where foreign countries are involved, a substantial portion of the remaining cost is in local currency.

The Andal Process has already been licensed to two separate corporations in the United States, and plants based on the method are being engineered. Franchises have also been granted for several foreign countries, including Canada, England and India. Other foreign arrangements are currently in the negotiation stage. The franchise includes not only the right to use the patented process, but also provides engineering and sustained technical services as well. This service may include thread processing if licensees require such additional technical assistance.

Proper Baffling Can Reduce Boiler Expenses in Rubber Plants

THE following problem was recently presented to a mechanical engineer by a rubber plant executive: Our boiler plant is consuming 36 tons of coal per day. The cost of the coal is $5.40 per ton. Heat value, 13,500 B.t.u. per pound. Flue gas temperature, 925 to 1100° F. How much money can be saved by proper baffling. The answer: Assuming that combustion is "good," namely, that 18 pounds of flue gas pass up the chimney per pound of coal, the average saving would amount to $10,500 per year.

There are four ways in which this can be considered:

1. Reducing the temperature from 1100 to 500° F. gives a saving of $13,620 per year.
2. Reducing the temperature from 1100 to 600° F. gives a saving of $11,380 per year.
3. Reducing the temperature from 925 to 500° F. gives a saving of $9,670 per year.
4. Reducing the temperature from 925 to 600° F. gives a saving of $7,400 per year.

The average of the above, which is equivalent to reducing the temperature from 1012 to 550° F., gives a saving of $10,500 per year. But combustion conditions are *not* good in the above plant. CO_2 is low. Considerably more can be saved than is embraced in the figures.

For those rubber plant executives who would like to solve similar problems, here is the rule: Subtract the flue gas temperature that will be obtained by proper baffling from the present flue gas temperature, in °F.; multiply by the present annual cost of fuel in dollars; then multiply by the present number of pounds of flue gas per pound of fuel; then by 0.24; and finally divide the product by the heat value of the fuel in B.t.u. per pound. The result will be the annual saving in dollars.

Applying the rule to the above problems we get this:

$$\frac{462 \times \$71{,}000 \times 18 \times 0.24}{13{,}500} = \$10.500$$

A Machine for Use in Buffing Strip Samples of Rubber Materials

By C. K. CHATTEN, S. A. ELLER and W. K. GONDEK

Material Laboratory, New York Naval Shipyard, Brooklyn 1, N. Y.

THE number of tests made by the Material Laboratory, New York Naval Shipyard, on natural and synthetic rubber products such as hose, gaskets, battery compartment linings and shaft coverings requires the preparation of a large number of buffed tensile and volume swell specimens. One of the major problems associated with this work is the preparation of smoothly buffed strip samples of uniform thickness from which the specimens are cut.

In order to carry out this work with a minimum expenditure of time and effort, the machine described below was designed and constructed. Although the present design of the machine is much the same as originally planned in about 1933 the equipment has, since then, been gradually improved in many respects. The improved equipment, as described below, has proved to be quite satisfactory for use in laboratory buffing work.

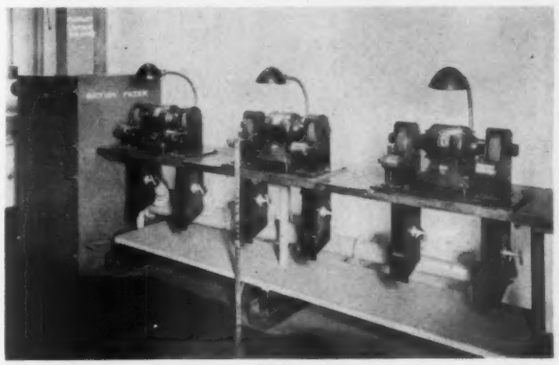


FIG. 1—Over-all view of rubber buffing apparatus showing arrangement of buffing machines and suction filter.

Equipment

As shown in Figure 1, the complete rubber buffing equipment consists of three double-end buffing machines, all mounted on the same bench, and a suction filter arrangement for use in collecting rubber buffings and loose grit particles from each machine. Any fumes resulting from the buffing operation are exhausted through the suction filter to the outside atmosphere. The data given on the name plates of the various parts of the equipment are as follows:

Buffing Machine Motors

Manufacturer—Atlas Press Company, Kalamazoo, Mich.
Frame—118; Type—KB; H.P.—½
Volts—110; Cycle—60; Phase—1
R.P.M.—3450; Amps—5.3

Note: The opinions or assertions contained herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

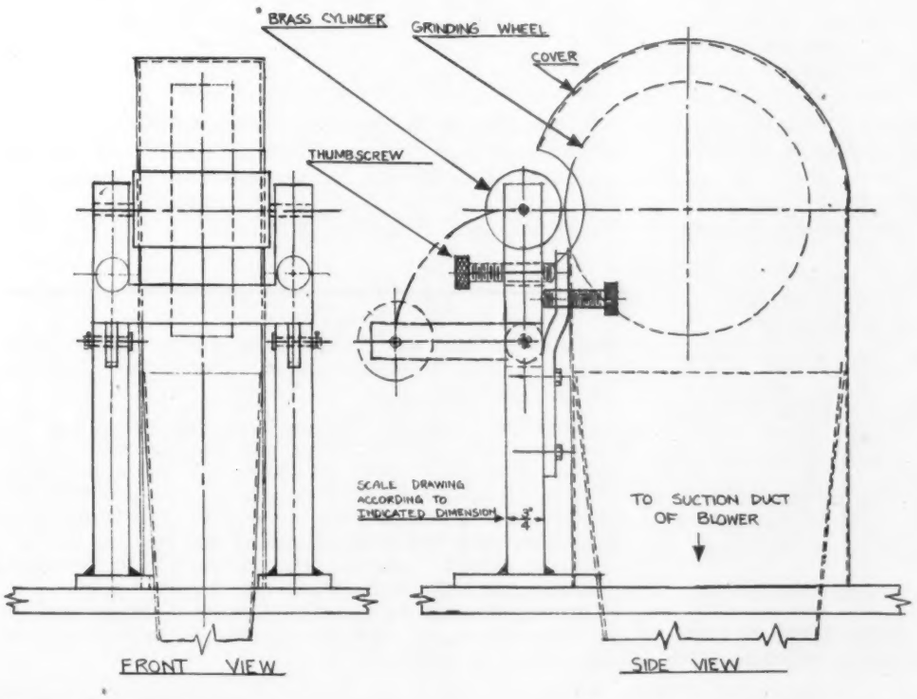


FIG. 2—Sketch of the roller guide assembly.

FIG. 3—Close-up view of the rubber buffing machine.

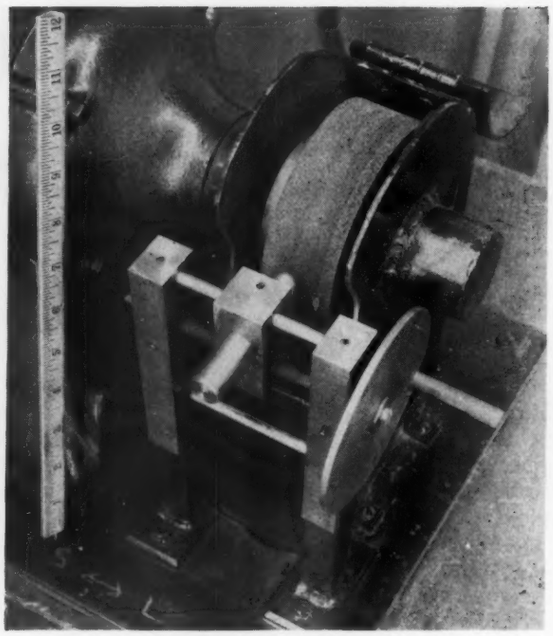


FIG. 4—Close-up view of diamond point emery wheel dresser.

Suction Filter
Manufacturer—The Cincinnati Electrical Tool Co., Cincinnati, Ohio
Type—AIR3; Model—102; Rating 1½ H.P.
R.P.M.—3450; Amps—4; Heat Rise—55°C.
Volts—220; Cycle—60; Phase—3

Emery Wheels	*Rough*	*Fine*
Manufacturer	Norton Company, Worcester, Mass.	The Carborundum Co., Niagara Falls, N. Y.
Size, in.	5x1½x⅝	5x1½x⅝
Type	3736 K5	C100L5 VG

Each buffing machine is equipped with a rough and a fine grain emery wheel and hollow brass roller guides for holding the rubber strip sample against the wheel. A sketch of the roller guide assembly is given in Figure 2.

Procedure

A strip sample that measures not more than about 12 in. long by 1½ in. wide by 5/16 in. thick is cut from the rubber product to be tested. The strip is cut in such a manner that at least one of its faces is fairly smooth. The rougher face of the strip is buffed first after which the strip is reversed for buffing operations on the other (fairly smooth) face. Strips that have two rough and irregular faces can be buffed. However, the final buffed strip is apt to have wavy surfaces even though the thickness is reasonably uniform.

In buffing a rubber strip, the roller guide is adjusted to a fixed distance from the emery wheel and held in this position against the thumb screw stop while the strip is drawn upward between the brass roller and revolving emery wheel. For rough buffing work, the brass roller for the rough emery is adjusted so that about 0.005 in. of rubber can be removed in each pass of the strip.

In the final buffing operation the brass roller for the fine emery is adjusted so that not more than 0.002 in. of rubber is removed for each pass of the strip. A close-up view of the buffing operation is given in Figure 3.

Diamond Dressing Tool

Whenever an emery wheel becomes grooved or otherwise damaged, the roller guide assembly is removed from the machine and replaced with a diamond dressing tool assembly so that the surface of the emery can be properly dressed. This arrangement consists of a steel frame and cross head properly positioned on the framework of the machine and a diamond tool that is moved slowly across the surface of the revolving emery wheel.

A suitable arrangement for use in performing the dressing operation is shown in Figure 4. The work frames of the three buffing machines have the same dimensions so that the dressing tool assembly can be used to resurface all emery wheels.

NOTE: This article was prepared in order to inform interested laboratories regarding the type of rubber buffing equipment used by the Material Laboratory, New York Naval Shipyard. The information contained herein should not be interpreted as an endorsement by the Navy Department of specific items of equipment.

ACKNOWLEDGMENT

In addition to the authors, those who shared in the development work on the Material Laboratory buffing equipment were Messrs. H. Nestlen, R. J. Tuero and M. Pearson, all of the Material Laboratory, New York Naval Shipyard, Brooklyn, N. Y.

Hercules Products for (1) Synthetic Fibers and (2) Textiles. Hercules Powder Co., Wilmington 98, Del. 7 x 9 in. 4 pp. each.

Describing briefly company products that are used in the manufacture of synthetic fibers and products used in the process of making textiles of cotton, silk, rayon and wool, these two booklets are part of a series outlining Hercules products and their application in industry. The booklet listing products for textile manufacturing and finishing includes chemicals such as casein, CMC (Hercules carboxymethylcellulose), nitrocellulose, and pine oil. Included in the booklet listing products for the manufacture of synthetic fibers are chemical cotton, cellulose acetate, nitrocellulose, pine oils, and alpha-terpineol.

Coagulant Deposition of Latices

I—Natural Latex

By H. B. MORRIS and R. F. HINDERER

Eagle Rubber Co., Ashland, Ohio

CHEMICAL coagulants have played an important part in the manufacture of consumer articles for many years. Balls, balloons, gloves, toys, tubing, automotive parts, coated trays, baskets, wire and many other items have been successfully dipped.

Several patents describe the basic procedures practiced today. (See Bibliography at end of article). Most current processes rely upon the coagulation of latex as brought about by the action of destabilizing chemicals in solvent media. In the preparation of dipped goods by these methods there are very many variables which must be recognized and controlled to assure maintained economy and quality.

This investigation was undertaken to determine the effect of operating variables. The data obtained is reported to stimulate interest and further work in this field. In light of the magnitude of the experimental work involved it seems best to report it in several parts. The first paper deals only with natural latex and how deposition was affected by time of immersion or dwell, coagulant concentration, latex pH, solids concentration and viscosity. Later reports will describe results obtained from neoprene latex, and other coagulating agents.

Experimental Procedure

Stock solutions of 5, 10, 15 20 and 25% calcium nitrate (Norwegian) were made up in denatured ethyl alcohol. A standard dust dispersion containing 20% micronized talc in alcohol was prepared as a pre-dip. The latex compound used in all experiments was taken from one lot. The material was precured, transparent, natural latex compound developed primarily for dipping. Dilutions were made with distilled water to which had been added NH_4OH to yield 2% NH_3 by weight.

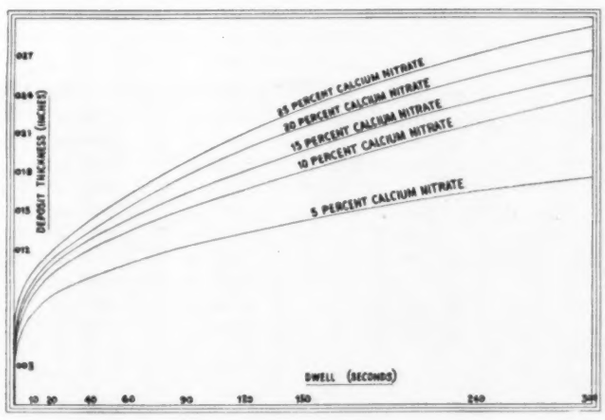


FIG. 1—Deposition versus dwell time.

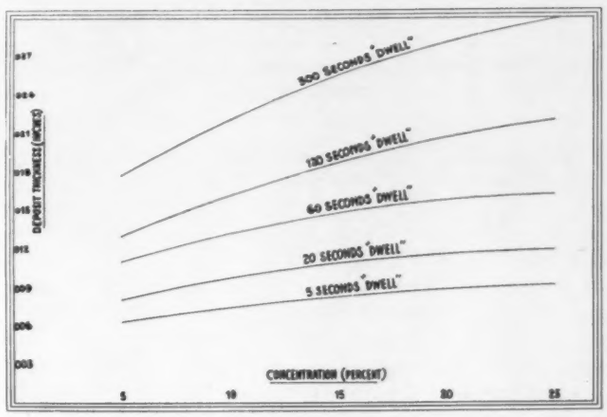


FIG. 2—Deposition versus coagulant concentration.

All dipping was done on cylindrical forms, known to the balloon trade as 315 airships. These forms were of aluminum, 6½ inches in length and 9/16 inches in diameter, with spherical ends. Rates of immersion and withdrawal were controlled by using a pulley arrangement driven by a constant speed motor with a simple clutch for starting, stopping and reversing. This rate was set at 60 in/min. Such a rapid rate was arbitrarily chosen in order to reduce the effect of length of form on the time of dwell. Viscosities were measured with a Brookfield Viscosimeter using the No. 1, 2 or 3 spindle rotating at 60 rpm. Spindle selection was made on the basis of instrument scale range adjustment. pH measurements were made with a Beckman Type G Meter. Total solids were measured by drying samples to constant weight.

The clean forms were first mechanically dipped in the talc dispersion and allowed to dry to whiteness at room temperature. They were then dipped in the coagulant under investigation and dried for one minute at room temperature. The coagulant-treated forms were then immersed in the latex for the reported interval and withdrawn. The deposited films were dried at 140°F. for 60 minutes, dusted lightly and stripped from the form. After slitting longitudinally, single film thicknesses were measured with a dial thickness gauge having a spring loaded ¼" foot. Three to five films were deposited in each experiment and the average thickness of the majority of samples in best agreement was recorded.

Effect of Immersion Time or Dwell

Forms treated with the standard coagulant solutions were dipped for periods of 5, 10, 20, 40, 60, 90, 120, 240

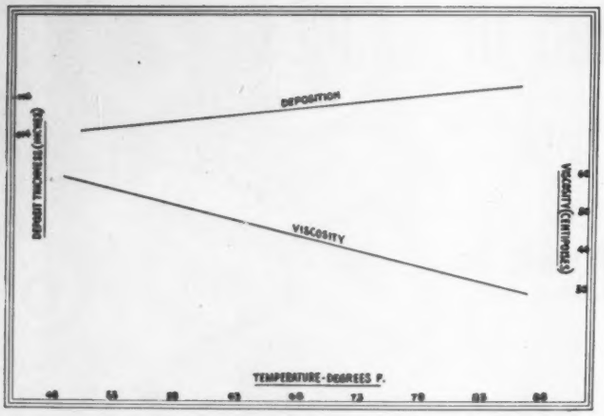


FIG. 3—Effect of temperature on deposition and viscosity.

and 300 seconds. The latex compound used in this experiment contained 48.4% total solids, exhibited a viscosity of 37 cp and a pH of 10.24. Film thicknesses for each coagulant concentration were plotted against the dwell intervals in Figure 1.

It is apparent from Figure 1 that deposition is very rapid during the initial 20 seconds of dwell. The rate then decreases to five minutes of immersion. As expected, higher concentrations of coagulant yield thicker films. Differences due to concentration are reasonably uniform except in the increase from 5 to 10%.

Effect of Coagulant Concentration

In Figure 2, deposit thickness is plotted against coagulant concentration for dwell times of 5, 20, 60, 120 and 300 seconds.

This plot again shows the increases due to concentration and clearly illustrates an enhanced concentration effect at dwell periods greater than 60 seconds.

Effect of Temperature on Deposition and Viscosity

Films were made using the 20% coagulant and a 60 second dwell. The latex compound was chilled to 50° F. and deposition measured as it warmed to room temperature.

Figure 3 illustrates the slight increase in deposition rate which occurs with a rise in temperature from 50° to 84° F. During the experiment the attendant drop in viscosity was measured and plotted during the temperature rise.

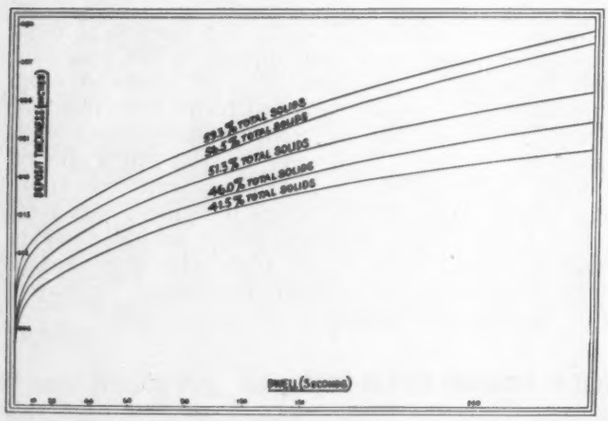


FIG. 4—Effect of solids on deposition.

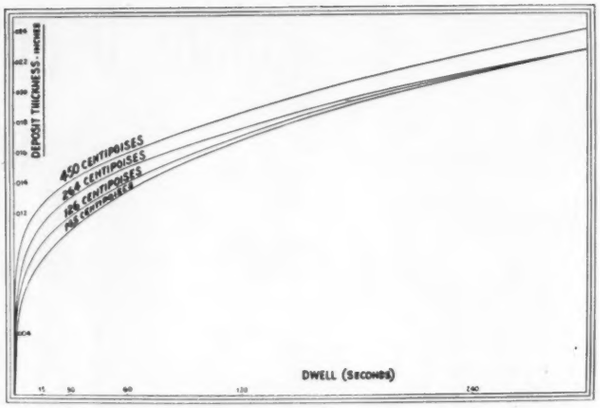


FIG. 5—Effect of viscosity on deposition.

It is remarkable that deposit thickness gained in spite of a noticeable falling off of viscosity.

Effect of Total Solids on Deposition

In this experiment a portion of concentrated latex at 59.3% solids with 300 cp viscosity was diluted to 41.5% with 2% ammonia water and the viscosity raised to 300 cp with a solution of Acrysol GA. Solids of 46.0, 51.3 and 56.5% were prepared by blending these materials of extremes. Deposition rates of these varying solids at constant viscosity using 20% coagulant are plotted in Figure 4.

These curves are similar to the coagulant concentration curves and show that deposit thickness increases with higher solids.

Effect of Viscosity

One portion of concentrated latex compound was diluted with ammonia water and another portion with Acrysol GA solution to a solids content of about 45%. These materials exhibited viscosities of 14.5 cp and 450 cp respectively. By blending, intermediate viscosities of 126 and 264 cp were obtained. Actual determinations showed all solids between 45 and 45.4%. Deposition rates using 20% coagulant are plotted in Figure 5.

These data indicate an interesting trend for curve intersection at five minute dwells except at viscosities greater than 264 cp. It seems reasonable to assume that within normal operating viscosity limits no great advantage can be expected from high viscosity when dwells are 3 minutes or longer.

pH	VISCOSITY	SOLIDS	AQUAREX SMO ON LATEX	DEPOSIT 10 SEC.	DEPOSIT 240 SEC.
6.97	240 cp	45.6%	0.50 %	.0116 IN.	.0295 IN.
7.38	14 cp	45.0%	1.25 %	.0073 IN.	.0214 IN.
8.38	16 cp	44.7%	0.66 %	.0069 IN.	.0225 IN.
9.65	11 cp	44.1 %	0.50 %	.0071 IN.	.0204 IN.
10.00	22 cp	44.8 %	0.25 %	.0079 IN.	.0243 IN.
10.42	20 cp	43.5%	——	.0076 IN.	.0199 IN.
11.02	13 cp	44.7%	——	.0083 IN.	.0217 IN.
11.20	13 cp	44.9%	——	.0077 IN.	.0209 IN.
11.30	13 cp	44.3%	——	.0088 IN.	.0213 IN.
11.81	12 cp	44.8 %	——	.0100 IN.	.0208 IN.

FIG. 6—Effect of pH.

Effect of pH

Hydrogen ion concentration was adjusted by diluting the concentrated latex compound with varying concentrations of monoethylamine or formaldehyde. The formaldehyde solutions were fortified with Aquarex SMO to prevent excessive thickening which accompanies reduction of pH.

The data tabulated in Figure 6 indicates that lowered pH seems to have no noticeable affect on deposition provided that the viscosity is maintained with Aquarex SMO. It is apparent that stabilizer concentration is a vital factor in low pH deposition, in fact it is quite likely that practical application would necessitate stabilizer concentration of such magnitude that any low pH advantage would be lost.

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Addenda to the History of Rubber

FROM time to time new light is thrown on the history of the rubber industry, not only on the existence of rubber as a raw material but on the manufacture of rubber products as well. The discovery of what are probably the oldest pieces of rubber existing in the world today was reported in the June, 1948, issue of the *Journal of Rubber Research*. The report follows:

In the early years of this country, the U. S. Consul at Merida, Yucatan, Mexico, Mr. Edward H. Thompson, purchased the estate of Chichen Itza, Yucatan, and with it a great part of the ruined town. The purchase included the sacred cenote, a sunken lake into which it was known sacrifices, including human beings, were cast as offerings to the rain gods of the Maya.

The cenote was dredged, but, unfortunately, scientific methods of investigation were not fully developed at that time, and the material recovered was not identifiable as coming from any particular stratum of the mud at the bottom, and no method was devised for keeping associated groups of objects together. There is no doubt, however, that all the specimens dated from pre-Spanish times, and that they largely represented the period during which Chichen Itza was under Toltec domination.

Chichen was first a Maya city, which rose to prominence in the tenth century A.D. as part of the League of Mayapan. This was due to the successful intervention in Maya politics by the Toltecs who at that period dominated a great part of Mexico. In 1168, civil war led to the downfall of Tula, the Toltec capital. Further refugee groups of Toltecs arrived at Chichen, and for a time brought it to a very high level of culture, but the Maya chiefs led a rising which put an end to Toltec power in Yucatan.

Thus, the majority of the articles dredged from the cenote of Chichen Itza must date from the tenth to the twelfth centuries A.D. They include some remarkable rubber objects, which have survived at least seven centuries in the lime-impregnated mud of a tropical lake. There are portions of small rubber figures which had been attached to balls of copal incense, composite balls of incense in which the rubber core had been coated with copal, and crude wooden figures on which more perfect features had been molded in rubber.

These unusual objects may be seen in the Peabody Museum of Harvard University, where under the supervision of Prof. A. M. Tozzer they have been scientifically examined and made available to students from all over the world. They are unique, probably the oldest pieces of rubber existing in the world, and it is unlikely that such a discovery will again be made of pre-Columbian rubber objects.

Perhaps in a more fortunately preserved tomb some traces of Maya rubber may be found, but it is likely to be in such small quantities that chemical means may have to be used in order to detect it.

Lima Electric Motors for Industrial Applications. (Bulletin MB-1). Lima Electric Motor Co., Lima, Ohio. 8½ x 11 in. 6 pp.

Arranged in handy loose-leaf style, this bulletin describes the company's line of electric motors, multi-speed gearshift drives, pedestal grinders, and polishing and buffing lathes. Cutaway views of the different items show the internal construction and working parts and illustrate the design. The various motors and drives produced by the company are shown by photographs.

Editorials . . . . . .

The End of Pharis?

WITHIN the next few weeks the stockholders of the Pharis Tire & Rubber Co. will be asked by the management to approve liquidation of the company. Estimates of the value of the buildings and equipment of the company at Newark, Ohio, have already been prepared by liquidators and tentative bids are already in possession of management officials. Unless management experiences a complete change of heart within the next few weeks, the 34-year-old concern, founded by Carl Pharis, will join the hundreds of other defunct tire manufacturing firms.

What set of conditions brought about this state of affairs? What insurmountable obstacles were constructed and by whom? What prompts a decision to close the doors on a concern which, on the surface, is entirely solvent? What lesson can the rubber industry at large, and the smaller tire manufacturers in particular, learn from the Pharis situation? A book could probably be written and would still fail to furnish all of the answers.

For every charge made by the Pharis management the local union involved has made a countercharge. Just prior to May 1 the management informed the union that it could not continue paying an average wage of $1.74 an hour and proposed contract changes which would reduce that average to $1.62 an hour. Incentive rates in particular were to be cut. The union flatly turned down the offer alleging that the company could easily continue to pay the old rates and continue the profitable production of tires. Management contends that its proposal would have been accepted if the union workers were allowed a secret ballot. Union leaders contend that there were at least three secret ballots taken, although as far as can be determined the results of such balloting have not been made public.

Major bone of contention between management and union was apparently the wage scale. Management contended that its wage rate was almost 10% above the Akron level. The union argued that the company itself set the rate in 1944. Management countered with the claim that as long as production efficiency was high it could afford the higher wage rate but that such efficiency had fallen off some 50% from the 1947 level. Union leaders produced a letter dated April 6, 1948, from a company official in which the union was thanked for "obtaining the high rate of productivity that has contributed so greatly to our competitive position in the past."

Claim and counterclaim! Charge and countercharge! But the facts remain. The union refuses to let down the bars on the wage rates and the Pharis stockholders will be asked to approve liquidation of the company within the next few weeks. Has the Pharis management decided that with the return of a buyers' market the competition in the years ahead will be too stiff to show a satisfactory profit and therefore it would be wise to liquidate while the company is still ahead of the game? Has the rubber union proved too obstinate on a matter of principle and would it rather see one small plant liquidated, with some 900 workers out of their jobs, rather than chance demands from other rubber manufacturers for lower wage rates? These are but two of the many perplexing questions.

There are other lessons to be learned from the Pharis situation. For example, in these days of razor-edge competition it is dangerous for any company to put all its eggs in one basket. It is smart policy to diversify one's products to avoid the peaks and valleys which so often shadow a single product, such as tires. Especially is this true for smaller companies competing with larger corporations. Today, more than ever before, only the strong survive.

There is still another lesson for all industry in this affair. As the *Akron Beacon Journal* pointed out in its Labor Day editorial, the attitude of management and labor toward each other across the conference table and in day-by-day relationships in the factories is far more important than any laws that Congress or the legislature can pass. No act of Congress can force the Pharis factory to continue in operation. Despite all of the labor relations laws on the books successful labor relations depend upon people—and people since time immemorial have been known to disagree.

CURRENT NEWS OF THE MONTH

PHARIS TIRE STOCKHOLDERS ASKED TO VOTE LIQUIDATION

According to an announcement by Furber Marshall, president of the company, made on August 20, stockholders of the Pharis Tire & Rubber Co. will be asked to approve liquidation of the company at a meeting to be held in the near future. Liquidation estimates on the Newark, Ohio, plant are currently being prepared. At the same time, Mr. Marshall stated that the company has notified its customers that no more orders for passenger car tires would be filled, except for those in transit or available from stock.

As previously reported, the Pharis plant at Newark has been shutdown since May 1, following a dispute with the union local. Claiming that it could not continue to pay the old rates and remain in a competitive position, the Pharis management proposed that incentive rates be cut and the work week lengthened from 30 to 40 hours. According to the union, this would have meant an average pay of $1.62 an hour as against the previous average of $1.74, and turned down the offer flatly.

In announcing the decision to submit liquidation proceedings to the stockholders, Mr. Marshall stated that the shut-down has continued for such a long period that "the company is no longer in a position to negotiate a loan with banks even if the difference with the union were to be ironed out now." He added that "under these conditions continued operation of the plant is impossible and liquidation is the only action left open to the company."

Mr. Marshall emphasized the point that company officials are prepared to present liquidators' estimates of the value of the buildings and equipment to company stockholders and that the company is already accepting tentative bids on local property to be presented to the stockholders for consideration along with the liquidation estimates. It is believed that the Owens-Corning Fibreglas Co., of Newark, is interested in taking over the Pharis plant for warehouse purposes.

Subsidiaries Not Affected

The Pharis Tire & Rubber Co. cperates two wholly-owned subsidiaries, the Carlisle Tire & Rubber Co., which produces inner tubes at Carlisle, Penna., and Molded Materials, Inc., which manufactures brake lining and automotive specialties at Ridgway, Penna. Neither of these two concerns are involved in the possible Pharis liquidation. The Pharis management has already shifted production of its bicycle tires to the Carlisle plant.

The Pharis Tire & Rubber Co. was founded over 30 years ago. The Newark plants occupy some 360,000 square feet of floor space on approximately 13 acres of land. They have a production capacity of 7,500 passenger tires and 10,000 bicycle tires a day. Normally, some 1,200 workers were employed, but this was cut down to 900 by the time the company ceased operations on May 1. The company showed a profit in each year of its operation except one.

Financial Statement Issued

According to a financial statement issued about September 7, Pharis showed a net loss of $319,796 for the first six months of the current year after a $190,000 tax carry-back credit. This compares with a net profit of $322,516, or 76 cents each on 424,600 common shares, for the corresponding period of the previous year. Net sales for the comparable periods were $5,044,481 and $10,082,200, respectively.

According to the balance sheet as of June 30, 1948, the company's net worth was approximately $4,500,000. Current assets amounted to some $4,000,000, including $439,000 in cash and $968,000 in notes. Current liabilities were approximately $915,000, plus some $1,500,000 due to banks running until 1955.

Government Sues for Taxes

To complicate the company's problems, a lien for unpaid taxes was filed against it by the U. S. Treasury Department on August 25. The lien amounted to $147,910, and was listed as "income" for the taxable period ended in 1947.

Reports from Newark indicate that the Pharis management has ambitions of going into lines of production which might prove more profitable than the tire business. This subject may be brought up at the forthcoming meeting of stockholders and may have some effect on any liquidation proceedings. It is possible that the Newark plant may be liquidated but the corporate structure retained and moved to some other locale.

Radioactive Tracers

A further indication that atomic energy is becoming of increasing importance in industry is seen in a recent announcement by the B. F. Goodrich Co. that among the experiments now being conducted in the company's new research center near Brecksville, Ohio, is one in which radio-active tracers are added to a chemical solution through which tire cords are passed. Radiographs reveal the amount of penetration, whether it is uniform and other characteristics of the solution on various types and grades of cord.

U.S. PURCHASES NATURAL RUBBER FROM GREAT BRITAIN UNDER ECA

A strategic materials mission of the Economic Cooperation Administration recently closed an agreement with British authorities for the purchase of 25,000 tons of natural rubber for stockpiling purposes. No prices were released but it was under stood in trade circles that the rubber was bought for 22 to 25 cents a pound. This was the first transaction under the Anglo-American economic cooperation agreement through which Britain undertook to facilitate the supply of raw materials to the United States for stockpiling.

Although the United States is paying for the rubber, the deal is in accord with the Congressional aim of assuring a flow of critical war materials in return for Marshall Plan aid. The Foreign Assistance Act provides that the foreign countries shall set aside local currencies received from the sale of United States recovery goods and devote them, in part, to recovery projects which will produce such scarce materials. It also directs ECA to arrange with Marshall Plan countries that the United States get a reasonable share of each country's output of such scarce materials.

The scarce materials may be acquired by the United States by sale, transfer, barter or other means. The intent of Congress was not to obtain the materials free, but to set up guaranteed sources of supply. The payment of dollars for these strategic items will in turn build up Europe's dwindlng dollar reserves. Evan Just, director of ECA's Strategic Materials Division, declined to say how much rubber ECA is seeking, but stated that the purchase from the British Government adds a substantial amount to the country's stockpile of this vital commodity.

The British have a stock of some 88,000 tons of rubber. With the conclusion of the deal with the ECA, it was announced that the remainder of stocks held by the British Board of Trade, with the exception of a small quantity of low quality rubber, had been withdrawn from the market and would be kept as a strategic reserve.

Clifton Adhesive Plant Burns

Flames fed by exploding drums of naphtha leveled the plant of the Clifton Adhesive Co., Clifton, N. J., on September 3, causing damage estimated at $30,000. The blaze started when a mixing vat filled with an inflammable material overturned, according to John De Vries, one of the plant's owners. Clifton firemen, summoned by a general alarm, managed to keep the blaze from spreading to a nearby gasoline tank farm. The Clifton company manufactures rubber adhesive tape and composition shoe soles.

NEW TYPE MACHINE MEASURES EFFICIENCY OF TRACTOR TIRES

A unique and highly scientific machine which measures the efficiency of rubber tires on farm tractors and which will help reduce the farmer's fuel bill, was described on September 9 before a meeting of the Society of Automotive Engineers in Milwaukee, Wisc.

Developed by U. S. Rubber Company, and the only device of its kind in existence, the machine is being used in a series of experiments conducted jointly by the United States Department of Agriculture and the rubber company to determine tractor tire performance under a wide range of loads and in various types of soil. These experiments are now taking place at the Department of Agriculture's tillage machinery laboratory on the campus at Alabama Polytechnic Institute, Auburn, Ala.

In these experiments, a tractor equipped with a single tire is mounted on the huge power machine and driven over a specially prepared soil bed approximately 250 feet long. Delicate instruments indicate the amount of draw-bar pull, traction and slippage of the tire in relation to the power applied to the tractor wheel.

Each tire undergoes a work-out in three different types of soil in order to approximate the same conditions which may exist under actual working operations in the field. In addition, for each tire twelve different draw-bar loads are used, thus making 36 individual runs for each tire.

According to J. W. Shields, U. S. Rubber development engineer, the experiments thus far show that tires vary radically in performance due largely to differences in construction and tread design. The results will enable tire manufacturers to design and build farm tractor tires for maximum traction and operating efficiency with a minimum of fuel consumption.

Royce in Zinc Oxide Field

The Royce Chemical Co., Carlton Hill, N. J., manufacturers of chemical specialties since 1929, has begun the manufacture of zinc oxide of the American Process type for the rubber, paint, rayon, ceramic and other industries. The company has been manufacturing a high grade of basic zinc carbonate, in pellet and powder form, for many years. Other products made by Royce Chemical include sodium hydrosulfite, sodium sulfoxylate formaldehyde, soluble zinc sulfoxylate formaldehyde, water repellents, desizing agents and detergents. Howard Royce, who heads the company's Rayox Department, will be in charge of zinc oxide sales.

Conneaut Rubber Is Sold

Edward J. Malek, one of the founders and president of the Conneaut Rubber & Plastic Co., of Conneaut, Ohio, manufacturers of rubber and plastic specialties, has sold his interest in that company to J. M. W. Chamberlain, of Akron, Ohio, who is now operating the concern. Mr. Malek, and others, have organized Allied Resins, Inc., in Conneaut, with a capitalization of $100,000.

Coming Events

Sept. 21. Buffalo Rubber Group, Westbrook Hotel, Buffalo, N. Y.
Sept. 24. Boston Rubber Group, Somerset Hotel, Boston.
Sept. 24. Chicago Rubber Group, Morrison Hotel, Chicago.
Sept. 26. Washington Rubber Group, Cosmos Club, Washington, D. C.
Sept. 30. Northern California Rubber Group.
Oct. 1. Detroit Rubber Group. (Tentative).
Oct. 5. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.
Oct. 15. Akron Rubber Group, Mayflower Hotel, Akron.
Oct. 15. New York Rubber Group, New York, N. Y.
Oct. 18-22. National Safety Congress and Exposition, Chicago, Ill.
Oct. 19. Buffalo Rubber Group, Westbrook Hotel, Buffalo, N. Y.
Oct. 28. Northern California Rubber Group.
Nov. 8-10. Rubber Diviison, A.C.S., Fall Meeting, Book-Cadillac Hotel, Detroit, Mich.
Nov. 18. R. I. Rubber Club, Crown Hotel, Providence, R. I.
Nov. 18. Northern California Rubber Group.
Nov. 28-Dec. 3. American Society of Mechanical Engineers, Annual Meeting, Pennsylvania Hotel, New York, N. Y.
Dec. 7. Los Angeles Rubber Group. Xmas Party.
Dec. 9. Southern Ohio Rubber Group, Xmas Party, Miami Valley Country Club, Dayton, Ohio.
Dec. 10. New York Rubber Group, Xmas Party, New York, N. Y.
Dec. 10. Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.
Dec. 14. Buffalo Rubber Group, Xmas Party, Westbrook Hotel, Buffalo, N. Y.
Dec. 17. Boston Rubber Group, Somerset Hotel, Boston.

Rubber Consumption Off in July

Total new rubber consumed in the United States in July amounted to 83,286 tons, compared with 94,905 tons in June, according to preliminary statistics of the Rubber Division, Department of Commerce. For the first seven months of 1948 new rubber consumption was 630,959 tons, a decline of 3% from the 649,980 tons consumed in the first seven months of 1947. Consumption of natural rubber in July was 48,775 tons, including 1,748 tons of latex, both figures being the lowest for any month this year. Synthetic rubber consumption at 34,511 tons was also the lowest recorded this year. Consumption of reclaimed rubber in July at 19,367 tons was the lowest since September, 1945. The ratio of reclaim to new rubber consumption declined sharply to 23.3% compared to 25.1% in June.

General Tire & Rubber Co. has bought the ground lease and two-story building at 608 to 614 West 57th St., running through 615 to 621 West 56th St., New York City, from the 57th Street Co., Inc.

GOVERNMENT CABLE CASE ENDS IN CONSENT DECREE

The government's anti-trust suit against four companies alleged to have monopolized the manufacture of fluid-filled, high-tension electrical cable was terminated on August 25 with the signing of a consent decree before Judge Harold R. Medina in United States District Court for the Southern District of New York.

The defendants, who consented to the judgment but denied the allegations in the complaint, were General Electric Co., General Cable Corp., Okonite-Callendar Cable Co. and Phelps-Dodge Copper Products Corp. The complaint charged that the four concerns had divided world markets with important foreign producers, fixed uniform prices in the United States, bought up patent rights and suppressed the exploitation of certain patents in the United States.

The judgment provides for cancellation of the allegedly illegal patent licensing agreements and forbids previous price arrangements. It also makes available to any applicant the patents involved on a non-exclusive royalty basis.

Commenting on the termination of the suit, Phelps-Dodge Copper Products Corp. issued the following statement:

"By agreement with the United States Department of Justice the anti-trust proceedings against Phelps-Dodge Copper Products Corp. and other companies have been terminated by the entry of the final judgment without trial and without any finding that the companies have violated any law.

"The judgment states it is issued before any testimony has been taken and without trial or adjudication of any issue of fact or law herein and without admission by any party in respect of any such issue in this or any other litigation."

Revertex Announces Merger

Revertex Corporation of America has announced that as of September 1, it has merged with its wholly-owned subsidiary, the Rubber Corporation of America. Company activities will be continued under the name of Rubber Corporation of America, Latex Division. General offices of the company remain at 274 Ten Eyck St., Brooklyn 6, N. Y., and manufacturing operations will continue at Hicksville, Long Island, N. Y. The manufacture of vinyl film and sheeting under the trade name "Rucoam," will be continued by the Rubber Corporation of America under the Rucoam Division.

URW to Convene in Omaha

The 14th convention of the United Rubber Workers of America, C.I.O., will be held in Omaha, Nebraska, starting on September 20. The URW executive board was scheduled to convene the week prior to the convention on September 13. Six main speakers will speak at the convention. It was expected that some 200 delegates would attend the meeting.

U. S. RUBBER CO.'S CAPACITY REPORTED AT ALL-TIME PEAK

Postwar expansion and modernization costing more than $80,000,000 has raised the production capacity of the United States Rubber Co. to the highest peak in its history, it was announced by Herbert E. Smith, president, on September 2.

Commenting on his company's progress on the third anniversary of V-J Day, Mr. Smith said $30 million has been spent since the war on tire production facilities and $50 million on non-tire products. "These improvements," he added, "include new buildings, new machinery and new research equipment which provide increased production and better quality.

"More than $24 million has gone into the expansion and modernization of plants producing hose, belting, friction tape, wire and other special rubber products used by the oil, automobile, electrical, railroad, steel and other major industries; also footwear, raincoat, coated fabrics, foam mattresses and cushioning, golf balls, bathing caps, hot water bottles, and many other items in the consumer field.

"Additional millions have been invested in new facilities for the production of chemicals, textiles and plastics. Many new uses are being developed for these materials through intensified research. One promising development is in the field of gum plastics, wherein various types of rubber are combined with resins to make materials of great strength which can be used in place of wood or metal in many applications."

To meet the unprecedented demand for goods the company has put the following new plants into operation since the war: Chicago, plastics and specialties; Washington, Ind., raincoats; Fort Wayne, Ind., engineered rubber products; Scottsville, Va., rayon tire cord; Burlington, N. C., new textile products; Milan, Tenn., sport footwear; Manchester, N. H., Lastex yarn and rubber thread, and Gastonia, N. C., combed cotton yarn.

Mr. Smith said that perhaps the most revolutionary development in postwar rubber chemistry is conductive rubber heating panels which are installed in the ceilings of homes to provide radiant heat by electricity. He said the new product being produced in largest volume at the present time is foam mattresses and cushioning.

Other new products include a golf ball with silicone center and rubber thread wound by electronic control; a conveyor belt possessing two and one-half to four times the strength of conventional belts; the world's smallest diameter electrical wire for homes, offices and factories; new chemicals to kill weeds and destructive insects; the first low-pressure tire, to make motoring safer, more comfortable and more economical; a rubber rug backing to "de-skid" rugs, thereby remedying one of the leading causes of accidents in the home; a slip-proof transmission and synchronizing belt with rubber teeth; an asbestos ironing board cover which will not burn; a new dish towel made of cotton and asbestos with superior polishing properties; and a new insulating material for refrigerators containing one per cent plastic and 99 per cent air.

"U. S. Rubber and the rubber industry in general have finally won the race between supply and demand," he said. "With the exception of a very few products, supplies of merchandise are ample and competition is growing keener. The real winner in this new market of abundance is the customer. The customer is our boss and from now on he will make us work harder to improve our products and services.

"U. S. Rubber welcomes the return of a competitive market. It affords us an opportunity to win many more friends who seek superior merchandise and superior service. Competition is the very foundation of our great American economic system. Without competition this nation could not have built the highest living standards in the world.

"The automobile tire is a good example of product improvement resulting from a free competitive market. Today's automobile tire is three times better than the tire of 1918 and six times better than the early tire of 1906. The latest advance in quality is a synthetic cold rubber tire tread developed during the last few months which gives 30 per cent more wear than any other tread heretofore known. The new rubber is processed at a temperature of 41 degrees against the standard temperature of 125 degrees. Manufacture of this new tire is just getting started and quantity production is some time off."

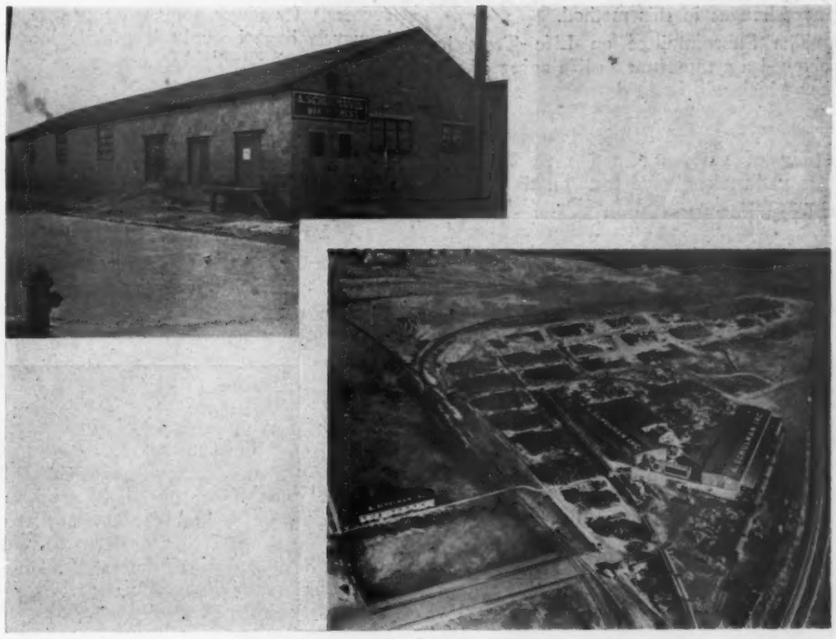
Plasticizer HB-40 Available

Monsanto Chemical Co., St. Louis, Mo., has announced the immediate availability of increased quantities of Plasticizer HB-40, which finds use in the plastics, coating and adhesive fields. The plasticizer is a partially hydrogenated mixture of isomeric terphenyls, and company officials stated that the product is of special interest as a co-plasticizer for polystyrene, vinyl resins, ethyl cellulose and asphaltic materials. Plasticizer HB-40 is said to be relatively non-migrating, and imparts good tensile strength, elongation and moisture resistance. Because of its effective electrical properties, it may be used in the manufacture of insulation and plastics parts for electrical equipment. It has average low temperature and volatility characteristics, and is practically non-toxic.

RRI Revised Information Cards

The Rubber Research Institute of Malaya, Kuala Lumpur, Malaya, has revised and re-issued its series of informational cards as of April, 1948. Containing information on the standardization and coagulation of latex, estate chemicals and their uses, defects in smoked sheet, the manufacture of pale crepe, and the preservation and testing of latex, the cards are designed for handy reference by rubber producers.

A. SCHULMAN, INC. CELEBRATES TWENTIETH YEAR IN BUSINESS



The old (top) and the new (bottom) plants of the Schulman organization.

This month marks the twentieth anniversary in the history of A. Schulman, Inc., Akron, Ohio. Twenty years ago, in August, 1928, Alex Schulman, president of the scrap rubber and plastics company, opened a single office and warehouse in Akron. Today, the organization maintains business facilities in Akron, East St. Louis, Ill., Boston, Mass., Long Beach, Calif., and in New York City and Jersey City, N. J. The company also operates complete facilities for an extensive import-export business. In commemoration of the twentieth anniversary, the company has issued a year book entitled "Pictorial Tour Through the Schulman Plants, Offices and Warehouses." Free copies of the book are available on direct written request to the company at 790 East Tallmadge Ave., Akron 9, Ohio.

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he judgment provides for cancellation the allegedly illegal patent licensing eements and forbids previous price ar-gements. It also makes available to any licant the patents involved on a non-lusive royalty basis.

ommenting on the termination of the Phelps-Dodge Copper Products Corp. d the following statement:

By agreement with the United States artment of Justice the anti-trust pro-ings against Phelps-Dodge Copper ucts Corp. and other companies have terminated by the entry of the final ment without trial and without any g that the companies have violated aw.

ie judgment states it is issued before estimony has been taken and without r adjudication of any issue of fact herein and without admission by any in respect of any such issue in this other litigation."

Revertex Announces Merger

ertex Corporation of America has ced that as of September 1, it has l with its wholly-owned subsidiary, bber Corporation of America. Com-ctivities will be continued under the of Rubber Corporation of America, Division. General offices of the com-emain at 274 Ten Eyck St., Brook-N. Y., and manufacturing opera-vill continue at Hicksville, Long Is-N. Y. The manufacture of vinyl nd sheeting under the trade name am," will be continued by the Rub-'orporation of America under the m Division.

URW to Convene in Omaha

14th convention of the United Rub-'orkers of America, C.I.O., will be Omaha, Nebraska, starting on Sep-20. The URW executive board was ed to convene the week prior to the ion on September 13. Six main will speak at the convention. It pected that some 200 delegates tend the meeting.

A SUPERIOR TIRE TREAD CARBON

The structure of this VFF carbon is purposely controlled to avoid excessive power requirements and high temperatures in mixing while maintaining smooth and rapid extrusion.

In GRS, tests show Statex K to provide at least 15% better road wear than EPC.

In Natural Rubber, road wear is also better than EPC.

COLUMBIAN CARBON COMPANY

500 TONS OF SMOKE A DAY

COLUMBIAN CARBON CO. MANUFACTURER

BINNEY & SMITH CO. DISTRIBUTOR

MPC (Medium Processing Channel)
STANDARD MICRONEX

◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

HMF (High Modulus Furnace)
STATEX-93

◆

FF (Fine Furnace)
STATEX-B

◆

VFF (Very Fine Furnace)
STATEX-K

◆

FEF (Fast Extruding Furnace)
STATEX-M

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

U. S. RUBBER CO.'S CAPACITY REPORTED AT ALL-TIME PEAK

Postwar expansion and modernization costing more than $80,000,000 has raised the production capacity of the United States Rubber Co. to the highest peak in its history, it was announced by Herbert E. Smith, president, on September 2.

Commenting on his company's progress on the third anniversary of V-J Day, Mr. Smith said $30 million has been spent since the war on tire production facilities and $50 million on non-tire products. "These improvements," he added, "include new buildings, new machinery and new research equipment which provide increased production and better quality.

"More than $24 million has gone into the expansion and modernization of plants producing hose, belting, friction tape, wire and other special rubber products used by the oil, automobile, electrical, railroad, steel and other major industries; also footwear, raincoat, coated fabrics, foam mattresses and cushioning, golf balls, bathing caps, hot water bottles, and many other items in the consumer field.

"Additional millions have been invested in new facilities for the production of chemicals, textiles and plastics. Many new uses are being developed for these materials through intensified research. One promising development is in the field of gum plastics, wherein various types of rubber are combined with resins to make materials of great strength which can be used in place of wood or metal in many applications."

To meet the unprecedented demand for goods the company has put the following new plants into operation since the war: Chicago, plastics and specialties; Washington, Ind., raincoats; Fort Wayne, Ind., engineered rubber products; Scottsville, Va., rayon tire cord; Burlington, N. C., new textile products; Milan, Tenn., sport footwear; Manchester, N. H., Lastex yarn and rubber thread, and Gastonia, N. C., combed cotton yarn.

Mr. Smith said that perhaps the most revolutionary development in postwar rubber chemistry is conductive rubber heating panels which are installed in the ceilings of homes to provide radiant heat by electricity. He said the new product being produced in largest volume at the present time is foam mattresses and cushioning.

Other new products include a golf ball with silicone center and rubber thread wound by electronic control; a conveyor belt possessing two and one-half to four times the strength of conventional belts; the world's smallest diameter electrical wire for homes, offices and factories; new chemicals to kill weeds and destructive insects; the first low-pressure tire, to make motoring safer, more comfortable and more economical; a rubber rug backing to "deskid" rugs, thereby remedying one of the leading causes of accidents in the home; a slip-proof transmission and synchronizing belt with rubber teeth; an asbestos ironing board cover which will not burn; a new dish towel made of cotton and asbestos with superior polishing properties; and a new insulating material for refrigerators containing one per cent plastic and 99 per cent air.

"U. S. Rubber and the rubber industry in general have finally won the race between supply and demand," he said. "With the exception of a very few products, supplies of merchandise are ample and competition is growing keener. The real winner in this new market of abundance is the customer. The customer is our boss and from now on he will make us work harder to improve our products and services.

"U. S. Rubber welcomes the return of a competitive market. It affords us an opportunity to win many more friends who seek superior merchandise and superior service. Competition is the very foundation of our great American economic system. Without competition this nation could not have built the highest living standards in the world.

"The automobile tire is a good example of product improvement resulting from a free competitive market. Today's automobile tire is three times better than the tire of 1918 and six times better than the early tire of 1906. The latest advance in quality is a synthetic cold rubber tire tread developed during the last few months which gives 30 per cent more wear than any other tread heretofore known. The new rubber is processed at a temperature of 41 degrees against the standard temperature of 125 degrees. Manufacture of this new tire is just getting started and quantity production is some time off."

Plasticizer HB-40 Available

Monsanto Chemical Co., St. Louis, Mo., has announced the immediate availability of increased quantities of Plasticizer HB-40, which finds use in the plastics, coating and adhesive fields. The plasticizer is a partially hydrogenated mixture of isomeric terphenyls, and company officials stated that the product is of special interest as a co-plasticizer for polystyrene, vinyl resins, ethyl cellulose and asphaltic materials. Plasticizer HB-40 is said to be relatively non-migrating, and imparts good tensile strength, elongation and moisture resistance. Because of its effective electrical properties, it may be used in the manufacture of insulation and plastics parts for electrical equipment. It has average low temperature and volatility characteristics, and is practically non-toxic.

RRI Revised Information Cards

The Rubber Research Institute of Malaya, Kuala Lumpur, Malaya, has revised and re-issued its series of informational cards as of April, 1948. Containing information on the standardization and coagulation of latex, estate chemicals and their uses, defects in smoked sheet, the manufacture of pale crepe, and the preservation and testing of latex, the cards are designed for handy reference by rubber producers.

A. SCHULMAN, INC. CELEBRATES TWENTIETH YEAR IN BUSINESS

The old (top) and the new (bottom) plants of the Schulman organization.

This month marks the twentieth anniversary in the history of A. Schulman, Inc., Akron, Ohio. Twenty years ago, in August, 1928, Alex Schulman, president of the scrap rubber and plastics company, opened a single office and warehouse in Akron. Today, the organization maintains business facilities in Akron, East St. Louis, Ill., Boston, Mass., Long Beach, Calif., and in New York City and Jersey City, N. J. The company also operates complete facilities for an extensive import-export business. In commemoration of the twentieth anniversary, the company has issued a year book entitled "Pictorial Tour Through the Schulman Plants, Offices and Warehouses." Free copies of the book are available on direct written request to the company at 790 East Tallmadge Ave., Akron 9, Ohio.

REPORT ON ACTIVITIES OF COMMITTEE D-11 ON RUBBER

A report on the annual meeting of Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials, which was held on June 25 in Detroit, Mich., was published in our July, 1948, issue. A further report on subcommittee activities has since been made available, as follows:

The committee held meetings over a three-day period and completed several matters which will be presented to the Society through the Administrative Committee on Standards. These include new tentative specifications for thermoplastic vinyl polymer sheaths for electrical insulated cords and cables.

The new Subcommittee on Rubber Latices reached agreement on proposed specifications and methods of test for concentrated ammonia-preserved, creamed and centrifuged natural rubber latex. These specifications are very timely and are needed because of the large number of new producers of latex, particularly natives in the Far East who have entered this field of production since the war. The proposed specifications, to be published as information, will indicate a level of quality for such materials.

A proposed method of measuring low-temperature stiffening of rubber and rubber-like materials by the Gehman torsion apparatus was accepted for publication as information. The Subcommittee on Low Temperature Tests is studying some further changes in this method.

The Subcommittee on Life Tests has planned a symposium on life aging of rubber which will be held at the next meeting of the committee. The Subcommittee on Tests for Coated Fabrics is continuing its study of various abrasion machines. It has undertaken some tests on the abrasion apparatus developed by Dr. Schiefer of the National Bureau of Standards and it is also continuing its study of the Taber Abraser and the American Seating Co. apparatus.

The committee withdrew from its report the recommended revision in the Tentative Specifications for Insulated Wire and Cable: Class AO, 30 per cent Hevea Rubber Compound (D 27-46 T). It is planned to submit this revision at a later date through the Standards Committee.

The technical Committee on Automotive Rubber, which functions jointly under the auspices of A.S.T.M. and the Society of Automotive Engineers, also met in connection with Committee D-11. The new tentative method of test for volume resistivity of electrically conductive rubber and rubber-like materials was prepared by this committee.

New tentative specifications for gaskets which cover a number of types made from a variety of materials were presented to Committee D-11 as tentative, subject to favorable letter ballot. Methods of testing V-belts were approved for submission to letter ballot. A revision of the test for contact and migration stain of vulcanized rubber in contact with organic finishes (D 925) is being studied.

"RUBBER AGE" NAMED U. S. DISTRIBUTOR OF "STATISTICAL BULLETIN"

The Secretariat of the Rubber Study Group, which has its headquarters in London, England, has appointed RUBBER AGE as its exclusive authorized distributor of the "Rubber Statistical Bulletin" in the United States.

The "Rubber Statistical Bulletin" is published monthly and contains world-wide collected and collated statistical and other general information on rubber. It is of vital importance to every company engaged in the rubber field, particularly the manufacturer of rubber products.

Annual subscription rate is only $5.00 per year. New and renewal subscriptions in the United States may be sent to RUBBER AGE, 250 West 57th Street, New York 19, N. Y.

Ramie Reciprocating Pump Packings

Ramie, one of the world's oldest vegetable fibers, is now being produced as packing for reciprocating pumps by the U. S. Rubber Co. Ramie packing is recommended for such uses as cold water and brine pumps because its high tensile strength and ability to absorb and retain lubricants minimize abrasion and prolong wear. The fiber is produced from a grass native to the Orient and now being grown in increasingly large quantities in Florida. Since its introduction into Europe in 1845, scientific efforts to find a sound practical end use for the fiber in the textile industry have met with only modest commercial success. Its tough, long wearing qualities, however, have brought it rapidly increasing popularity and acceptance among engineers as a packing material. U. S. Rubber is marketing ramie packing square plaited, in coil form and in sizes of one-quarter inch thickness and larger.

Chlorinated Rubber Traffic Paint

Hercules Powder Co., Wilmington, Del., has announced a new traffic paint based on two company chemicals, Pentalyn 802A, a synthetic resin, and Parlon, chlorinated rubber. Traffic paints based on these chemicals are said to be outstanding from the standpoint of durability and speed of drying. Drying speeds of these paints vary from 11 minutes to 20 minutes, depending on such factors as thickness of film and type of solvent. Test cross lines laid down on a highway intersection in South Camden, N. J., considered to be the second busiest highway intersection in the state, show little signs of wear after more than two months of service.

Offer Employment Service

As a practical means of helping scientists and engineers to use, further develop and be paid for their highest capabilities, the Scientists' and Engineers' Association, Rock Rimmon Road, Stamford, Conn., has organized a service specializing in placing scientists and engineers in employment connections throughout the United States. The service is open to all technologists as well as to prospective employers.

Polyco 296 Synthetic Thickener

Polyco 296, a new synthetic thickener for latices and resin emulsions, of special interest to manufacturers of adhesives, protective coatings and saturants, has been developed and introduced by the American Polymer Corp., Peabody, Mass. The new material is an aqueous solution of the sodium salt of an acrylic acid copolymer, and has the following specifications: Concentration, 15%; color, slight yellow; turbidity, slightly cloudy; viscosity, over 100,000 cps. at 25° C.; pH, 8 to 9. Advantages claimed for Polyco 296 include heat stability; high viscosities at low concentration; non-oxidizing, non-yellowing flexible films; non-creaming, mechanically stable compounds with latices and emulsions; resistant to oils, fats, greases and aliphatic solvents, and will not support bacterial growth.

Belgian Congo Rubber

Although the output of rubber in the Belgian Congo is expected to amount to only 6,000 tons this year, compared with some 4,000 tons in 1946 and 4,500 tons in 1947, it should be capable of rapid increase over the next few years and possibly reach almost 50,000 tons by 1951, according to information reaching the U. S. Department of Commerce. A development program is now in process designed to improve treatment facilities to enable Congo rubber to be sold as standard crepe and other established specifications. To date, there have been some difficulties in conforming to specifications.

Rubber Consumption Drops in July

Preliminary estimate by the Rubber Manufacturers Association indicates total rubber consumption in July of 85,135 long tons as compared with 95,010 long tons in June, a decrease of 10.39%. Total natural rubber consumed was estimated at 50,418 long tons, a reduction of 9.47% from June when 55,692 tons were used. Total synthetic rubber consumption was estimated at 34,717 long tons, a decrease of 11.70% from June, when 39,318 tons were consumed. It was also estimated that 21,079 tons of reclaimed rubber were used in July as compared with 23,527 tons in June.

COMMITTEE D-14 ON ADHESIVES ENGAGED IN ACTIVE PROGRAM

Committee D-14 on Adhesives of the American Society for Testing Materials is currently engaged in an active program involving the innumerable problems presented in the field, including standardization, testing procedures, and the like.

One phase of standardization receiving much attention in Committee D-14 is that of determining strength properties. The present test for tensile properties has now been found to be both practical and usable for materials other than wood, including metals, and present activities are being devoted to developing a simplified method. Other strength properties for which test methods are being prepared, or have been prepared, include metal-to-metal shear strength, impact strength, fatigue, flexural, 90-degree peel, and cleavage.

In studying the effect of moisture and temperature on permanence of adhesives a method of continuous exposure tests is being perfected. Suggestions are being considered for provisions for preconditioning of samples and to permit presoaking. Conditions have been agreed upon in the test work on cycling tests to include the following types: interior moderate, interior severe, exterior land and aircraft, and exterior marine. Round-robin tests are now in process to study the effect of light on permanence of adhesives using various light machines. Comments are to be elicited on a tentative procedure for ascertaining the effect of biological factors on permanence of adhesives.

Various aspects of the working properties of adhesives are receiving attention. This includes round-robin tests on measuring tack and blocking. In the latter case, the present A.S.T.M. method under the jurisdiction of Committee D-20 is being revised in order to be adaptable for use in the adhesives field. Other working properties being studied include rate of strength development, consistency, storage and working life, and gap filling.

The committee has given much consideration to the type of specification which is felt to be most desirable to formulate. Tentative agreement has been reached on specifications based on performance with the privilege of specifying the best chemical type of material. The initial effort is a specification for adhesives suitable for adhering wood-to-wood.

Many fundamental research problems have been considered wtih the emphasis being on pure strength properties. A new subcommittee has been established to study the electrical properties of adhesives.

Takes Over Chemical Activities

Humphrey-Wilkinson, Inc., has been organized in New Haven, Conn., to take over the manufacturing and sales activities of the Chemical Division of the Connecticut Hard Rubber Co. The new corporation will continue to manufacture a broad line of intermediate molecular weight aliphatic derivatives, including the series of olefins, alkanes, ethers and mercaptans which have become fairly well known under the original name.

DuPont Offers Liner Service

As an aid to tire manufacturers in handling and storing rubber, E. I. du Pont de Nemours & Co. has developed a coated fabric liner which is to be used between layers of uncured rubber in storage or transit. Named DuPont Liner No. 1, the fabric is of duck material coated in the desired color with a pyroxylin solution containing special plasticizers that prevent sticking. Manufactured in the Newburgh, N. Y., plant, the company does not sell the liner, but simply processes the duck for tire manufacturers. The treated fabric is embossed in Doric grain which is said to allow the liner minimum contact with the rubber. Loss by shrinkage is very small.

Organize Scrap Rubber Firm

The Sider Rubber Company was recently organized to engage in the purchase and sale of scrap rubber. The new company will occupy about a quarter of an acre of land on Morgan Avenue in Akron. According to a company spokesman, the business will be in full operation shortly.

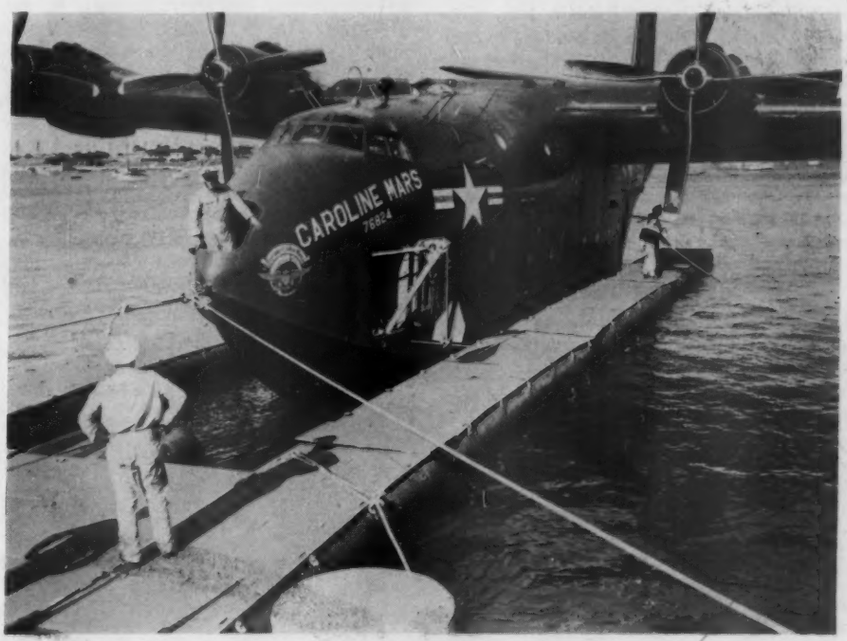
Digest of Dielectric Literature

Volume XI of the annual Digest of Literature on Dielectrics has been prepared and issued by the Committee on Chemistry and Physics, Conference on Electrical Insulation, National Research Council, Washington 25, D. C. This latest issue covers developments in dielectrics during 1947, including ceramic insulation, insulating oils, synthetic plastic insulation, and rubber insulation. The report on rubber was prepared by John T. Blake and R. Lyle of the Simplex Wire & Cable Co.

Aging Study of Geon Polyblend

Results of air oven aging tests conducted on Geon Polyblend formulations have been made available in a special report by the B. F. Goodrich Chemical Co., Rose Building, Cleveland 15, Ohio. The tests are said to indicate that these formulations are superior to polyvinyl chloride plasticized with the common ester type plasticizers for applications where resistance to elevated temperatures is important. Copies of the report can be secured without cost on request to the company.

PORTABLE RUBBER DOCK USED TO BERTH U. S. NAVY'S CAROLINE MARS



A big portable rubber dock, built by Goodyear Tire & Rubber Co., was used to berth the U. S. Navy's Caroline Mars at Chicago recently when the colossal flying boat ended its record-setting 4,748-mile flight from Honolulu. Built in inflatable sections, the rubber dock components were flown from Akron to Chicago for assembly at the Mar's mooring on Lake Michigan.

Developed jointly by Goodyear and the Navy Bureau of Aeronautics, the new light-weight dock is the answer to the need for docking facilities at advance bases during wartime. The entire unit can be disassembled and carried in one plane. Minor repairs could be made from the dock, but its primary function is to provide tie-up facilities for refueling, loading and unloading cargo and personnel from seaplanes at places where more permanent installations have not been made.

The inflatable dock comprises nine coated fabric pontoons decked over with a marine grade plywood. When completely assembled, the pontoons are arranged to form an elongated "U." Deck panels are hinged to provide necessary rigidity for unity, while at the same time being flexible enough to undulate with water motion and movement.

The completed unit, 25 feet across the bow and 103 feet long, can be erected in from four to six hours by an inexperienced crew. In emergencies or for short distances the entire assembly may be towed by seaplane or surface craft.

Strobeck Named Vice-President

L. C. Strobeck

L. C. Strobeck has been appointed vice-president in charge of mechanical sales of the Dayton Rubber Co., Dayton, Ohio, succeeding T. C. Davis, who has resigned. Mr. Strobeck will be in charge of industrial, automotive, railway and roller sales. Before joining Dayton Rubber, Mr. Strobeck spent 13 years with leading rubber companies where he held production and sales managerial positions in their mechanical goods divisions. He joined Dayton Rubber in 1928, and for the past 16 years has been Chicago, Ill., district and zone manager with headquarters in that city. Prior to that he was New York district manager for 3 years.

Another British Black Plant

Since publication last month of the news that carbon blacks of the Philblack type will be manufactured in England by the Palatine Development Co., Ltd., it has been learned that at least one other company is planning the production of carbon black in that country. United Carbon Black, Ltd., has been organized by United Kingdom Chemicals, Ltd., which is itself a relatively new company, to manufacture carbon black from a special process developed by Dr. Michael Steinschlaeger, a 44-year old Russian. Dr. Steinschlaeger acted as an advisor to the British Ministry of Economic Warfare during the late war. There are also rumors to the effect that a third company is considering the production of carbon black at Liverpool.

Manufacturing Lactoprene EV

B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced the manufacture of Lactoprene EV, a modified polyacrylic ester. This material is an experimental product developed by the Eastern Regional Research Laboratories for the Department of Agriculture. To be redesignated as Polyacrylic Ester EV, it will complement other nitrile and polyacrylic ester type rubbers now being manufactured by the company. The material is currently available in pilot plant quantities only.

Seek to Purchase Aetna Rubber

Akron and eastern interests are said to be seeking to buy the assets of the Aetna Rubber Co., Cleveland, Ohio, for approximately $350,000. Aetna directors approved the conditions of sale recently, and are awaiting the approval of stockholders. The company has 200 shareholders, with 496 shares of preferred and 88,000 shares of common stock. The preferred is quoted at $50.00 and the common at $1.00. The purchase plan would give preferred holders about $100.00 a share. The balance of the purchase price would go to the common shareholders after payment of the company's obligations. Aetna Rubber was founded in 1919 by E. W. Perry, an industrialist of Cleveland. William A. Koeth is president of the company, J. C. Dunne is vice-president, E. W. Ferry, Jr., is treasurer, and Philmore J. Haber is secretary. Operations have been halted and 125 employees laid off pending outcome of the sale. It is understood the bidders for the company expect ot continue operations in Cleveland.

Leakproof Tubes For Airplanes

Development and production of a new leakproof tube for airplanes, both military and commercial, has been announced by the Firestone Tire & Rubber Co. The new tube will hold air four times longer than ordinary tubes, thereby reducing tire and maintenance costs while increasing safety and reliability. Called the Firestone Sky Champion Leakproof Tube, the product is available for shipment in all sizes. Secret of the leakproof tube, it is said, is chemical treatment of the inside of the tube without increasing its weight. This chemical counteracts the normal seepage of air through the wall of the tube. Inflation checks will be required less frequently, the company stated.

Foamex Plant to be Doubled

Firestone Tire & Rubber Co. has announced a million dollar expansion program that will more than double the output of foamed latex at its Fall River, Mass., plant. The new program, involving construction of new buildings and installation of a substantial amount of new equipment, will result in the hiring of 600 to 700 additional plant employees. The Fall River plant presently employs about 2800 men and women for all its manufacturing operations Increased demands for Foamex, Firestone's foamed latex, were quoted as the reason for the expansion.

Koppers' New Chemical Section

The Engineering & Construction Division of Koppers Co., Inc., has set up a new Chemical Section to supervise and coordinate engineering and construction work on contracts secured for the erection of plants to produce oxygen, synthetic fuels, and certain types of chemicals. Heading up the new section will be T. M. Osborne, who has been project manager on Koppers' contract to build a $4,500,000 synthetic fuels plant for the Government at Louisiana, Mo.

Smith Forms Sales Organization

Holland W. Smith

Establishment of a new national sales organization specializing in pigments, chemicals and resins to be known as Holland W. Smith, Inc., was announced recently following the resignation of Mr. Smith as executive vice-president and sales manager of Thompson-Weinman & Co., New York. The new company will maintain its New York offices in the Empire State Building and will specialize in sales and technical service to manufacturers of protective coatings, rubber, plastics, floor coverings and allied industries. Mr. Smith as president of Holland W. Smith, Inc., will have as his associates several people well knowr to the trade. Other officers of the corporation are Holland W. Smith, Jr., who recently resigned as vice-president and director of Webber & Smith, Inc., Thomas N. Loser, formerly assistant sales manager of Thompson-Weinman, and Miss Eloise Dabbs, previously associated with the company as office manager.

Monsanto Divides Sales Department

Division of the Industrial and Surface Coating Resins sales department into two groups within the Plastics Division of the Monsanto Chemical Co. was announced recently. One of the new sales groups, the Adhesives and Industrial Resins Department, will be headed by E. Everett Decker, formerly district manager at Lockport, N. Y., for Monsanto's Western Division. Assisting him will be Edmund S. Bauer, Jr., formerly assistant sales manager of the Industrial and Surface Coatings Resins Department. The products of the department will include Resinox and Resimene resins, other than molding materials, and plywood adhesives, bonding resins and glues. Albert W. Dunning will continue as head of the Surface Coatings Resins Department, assisted by William G. Davis, until now a member of the Sales Development Department. In addition to surface coating resins, the department will be responsible for the sale of styrene monomer produced at the company's rebuilt Texas City, Texas, plant, and for formaldehyde, soon to be produced at a new plant in Springfield, Mass.

DEMAND FOR RUBBER PRODUCTS CONTINUES AT PEACETIME HIGH

After three years of peacetime production during which a tremendous replacement backlog has largely been filled, the demand for all rubber products still continues at high levels compared to the immediate pre-war years, P. W. Litchfield, Chairman of the Goodyear Tire & Rubber Company, said recently. Mr. Litchfield estimated that the replacement demand for passenger car tires in 1949 would exceed this year's estimated output of 40,500,000 tires and that the replacement demand for truck and bus tires would equal the 1948 production of approximately 7,500,000.

The outlook for total tire production for 1948, even with an expected seasonal decline in the fourth quarter, is for some 86,000,000 tires against last year's all-time record of 100,000,000 and between 60,000,000 and 63,000,000 in the best of the pre-war years. Current estimates for 1949, according to Goodyear's chief executive, place the demand at roughly 81,000,000 tires, barring any serious readjustments of the current inflationary spiral. During the past three years, approximately 260 million tires for motor vehicles have been produced by the American rubber industry compared with 180 million in the three-year period just prior to the war, an increase of 45 per cent.

Mr. Litchfield called attention to the heavy continuing demand in the non-transportation group of rubber products such as mechanical goods, heels and soles, and the new developments such as foamed rubber, rubber films and covering materials. In this field approximately 30 per cent of all new rubber, both natural and synthetic, is consumed. Over 300,000 tons of rubber should be consumed in the non-transportation group this year and approximately the same in 1949, with total consumption in the United States running around 1,000,000 tons.

The high level of demand for tires and other rubber products was attributed by Mr. Litchfield to the increased number of cars, trucks and tractors in operation, to a continued unsatisfied demand for all types of new motor vehicles, to increased mileages driven yearly and to sustained high levels of purchasing power and business activity.

Disposable Drum Liners

Disposable drum liners, developed and manufactured by Cincinnati Industries, Inc., Cincinnati (Lockland), Ohio, are reported to be solving the drum shortage for shippers of substances in open-head, returnable type drums. Called X-Crepe Drum Liners, the disposable liners consist of films of Pliofilm or polyethylene used in conjunction with X-Crepe, described as a unique paper product possessing the property of all-directional stretch. Substances now shipped and stored in drums protected by these liners include water-borne dispersions of latex and water-borne dispersion type adhesives. Savings for shippers include the cost of cleaning drums and the cost of coating drums subsequent to cleaning.

Current Status of Denman Rubber

Several changes have recently been made in the corporate and manufacturing activities of the Denman organization, and the following data, supplied by the principals, will clarify the current status of the organization.

The manufacturing company is the Denman Rubber Manufacturing Co., an Ohio corporation, which purchased the plant and equipment of the Denman Tire & Rubber Co. at Warren, Ohio. Although the Denman Tire & Rubber Co. has stock in the manufacturing company and is represented on the board of directors, it does not control the manufacturing company. The latter company now has its headquarters at 52 Vanderbilt Ave., New York 17, N. Y.

Officers and executives of the Denman Rubber Manufacturing Co. are: *President,* H. F. Webster; *Treasurer,* Russell D. Porch; *Factory Manager,* Herbert T. Beal; *Technical Superintendent,* Charles G. Miller; *Purchasing Agent,* James R. Jones. The manufacturing company is currently engaged in the production of Denman tires, Webster camelback, and molded rubber textile specialties, all for the account of the Denman Tire & Rubber Co. The company also makes some other brand tires and mechanical goods on its own account.

Officers of the Denman Tire & Rubber Co. include W. B. McCandless as president and C. L. Mason and O. A. Moore as vice-presidents. The Webster Rubber Co., of Warren, Ohio, which sells Webster camelback and tube repair materials, is wholly owned by the Denman Tire & Rubber Co.

DR. GERALD J. LEUCK, director of research of the Glyco Products Co., has been transferred to the Nastrium, W. Va., plant of the company as technical director.

Hewitt "Yard'n Gard'n" Hose

Entering another product into the consumer field for rubber goods, Hewitt Rubber Division, Hewitt-Robins, Inc., Buffalo, N. Y., has announced a new rubber hose. Named the "Yard'n Gard'n" hose, the new hose is hard to kink but easy to coil. The carcass of the hose is made of braided cord and is said to provide ample resistance to pressure and crushing. It is available in two types, either the double-braid Seneca type or the single-braid Oriole type. The hose cover is made of weather-resistant rubber that withstands cutting and abrasion. Available in either red, green, or black, the hose is equipped with full-flow couplings which provide the advantage of unrestricted flow of water. With this coupling, the internal collar is expanded against the wall of the tube, rather than depressing the outer collar as is common with other types of garden hose.

Rubber Demand Rises Steadily

John L. Collyer, president of the B. F. Goodrich Co., stated recently that the rubber industry definitely has moved up onto a higher plateau of activity in the postwar ERA. In seeing a steadily increasing demand for rubber products in this country, Mr. Collyer noted that more than 3,135,000 long tons of rubber have been consumed in this country in the last 3 years. A considerable quantity of this sum was synthetic rubber. Consumption of rubber since the war compares with a little more than 2,025,000 long tons used in the 3 years that immediately preceded Pearl Harbor. Mr. Collyer said that in the 3 years since V-J Day the rubber industry has produced an average just under 16,000,000 truck and bus tires annually. The average annual output of this type of tire in 1939, 1940 and 1941, was 9,000,000.

NEW QUARTERS FOR DAYTON CHEMICAL PRODUCTS LABORATORIES

View of one section of the new Dayton Chemical laboratory.

Dayton Chemical Products Laboratories, Inc., has completed a move to new quarters at West Alexandria, Ohio. Formerly located in Dayton, Ohio, the company's new location is approximately 16 miles west of that city. Manufacturing and storage facilities have been expanded considerably, and a new chemical laboratory has been added to supplement the rubber adhesives laboratory previously maintained by the company. The company specializes in rubber adhesives, liquid rubber products, and rubber compositions in general. Consulting services are also offered.

NAMES IN THE NEWS

CHARLES V. DOUGLAS, associated with Diamond Alkali Co. for 26 years, has been appointed assistant to the vice president in charge of sales of the Heyden Chemical Corp.

A. N. GUY, formerly district manager at Detroit, Mich., for the Fisk Tire Division of the U. S. Rubber Co., has been appointed manager of the allied products department of the parent company's tire division, succeeding C. E. MARSHALL, who has been granted leave of absence to serve with the Economic Cooperation Administration.

R. C. MURRAY, well-known rubber chemist who has been associated with various rubber concerns, including the Casto Company in West Virginia, is now associated with the Duro-Gloss Rubber Co. at New Haven, Conn.

CHARLES G. CRITES, senior tire designer at the Akron plant of the Goodyear Tire & Rubber Co., has been appointed manager of the Technical Service Division of the company's plant in Buitenzorg, Java.

G. WILLIS BEAVERS has been appointed vice-president in charge of sales of Thompson, Weinman & Co., New York 17, N. Y., succeeding HOLLAND W. SMITH, who recently resigned.

ROBERT F. BROWN has been appointed chemical sales manager of Emery Industries, Inc., succeeding C. W. SAMPSON, who was named to head the newly-formed Export Department of the company.

DR. WILBUR O. TEETERS, associated with the Sun Chemical Corp. since 1946, has been appointed director of research, succeeding DR. PAUL V. MCKINNEY, who recently resigned.

DR. ALDRICH SYVERSON, former manager of the B. F. Goodrich Chemical Co. plant at Avon Lake, Ohio, has been appointed associate professor of chemical engineering at Syracuse University.

WALTER E. BREWER, associated with the Nopco Chemical Co., Harrison, N. J., for the past 12 years, has been appointed district sales manager for the newly-created eastern district of the industrial division of the company.

DR. CHARLES W. SELHEIMER, head of personnel selection and training in the development department of the U. S. Rubber Co., has been appointed professor of chemical engineering at the Illinois Institute of Technology.

ROBERT E. RUHOFF, formerly associated with the B. F. Goodrich Co., has been appointed general manager of Pyrole Products Corp., Portsmouth, Ohio.

JOHN J. WYLE, associated with the Goodyear Tire & Rubber Co. since 1933, has been appointed purchasing agent of the company's Topeka, Kan., plant, succeeding C. W. GILCHRIST, who has accepted a position with the Toledo Scale Co.

FRANK R. SPITZNAGEL, JR., previously associated with the industrial fabrics division of Calloway Mills, Inc., New York City, has been named manager of the Detroit, Mich., sales office, effective October 15.

HYNES PITNER, formerly vice-president in charge of sales and a director of the Pharis Tire & Rubber Co., has joined William S. Moore, Inc., Newark, Ohio, in an executive capacity.

J. J. MURRAY, who has served in various export capacities with Hewitt-Robins, Inc., during the past 28 years, has been appointed to the newly-created position of export manager for the corporation.

H. E. SELBY, formerly in charge of the research laboratories of the McCordi Corporation, has been appointed research director of the Bishop Gutta-Percha Co., New York.

H. H. SMITH, who joined the Cooper Tire & Rubber Co., Findlay, Ohio, in 1947 as assistant manager of the Cooper Service Division, has been appointed manager of that division.

E. E. LAUGHLIN, chief chemist of the Pharis Tire & Rubber Co., Newark, Ohio, will shortly leave for Buenos Aires, Argentina, where he will assume complete charge of all technical work for the F. A. T. E. Company.

W. J. SEARS, vice-president of the Rubber Manufacturers Association, has been appointed chairman of a task committee of the Economic Cooperation Administration which has been created to streamline organizational operations.

SAMUEL E. CAMPBELL, associated with the purchasing department of the Goodyear Tire & Rubber Co. for the past 20 years, has been named purchasing agent of the Lamb Electric Co., Kent, Ohio.

NORMAN RABJOHN, formerly associated with the Goodyear research staff at Akron, is now associate professor of organic chemistry at the University of Missouri, Columbia, Mo.

KENNETH L. MILLIGAN, vice-president and sales manager of the Pioneer Rubber Co., has resigned his position and moved to Florida where he will operate a motor court. J. C. BOWMAN has joined Pioneer as sales manager, succeeding MR. MILLIGAN.

Burnett Retires From U.S. Rubber

M. George Burnett, former factory manager of the Providence, R. I., plant of the U. S. Rubber Co., and more recently a consultant on the staff of the vice-president and general manager of the mechanical goods, general products, Lastex yarn and rubber thread divisions of the company, retired recently after 29 years of service. Born and educated in Boston, Mass., Mr. Burnett started his business career with the Consolidated Fastener Co. as payroll and cost clerk. He came to U. S. Rubber in 1919 from the Framingham Foundries, Framingham, Mass., where he had been works manager. For 15 years he served as assistant comptroller of the parent company and control manager of the footwear division in Naugatuck, Conn. In 1936 he became factory manager of the company's plant in Providence, in which capacity he served more than 11 years. Officials and employees of the Providence plant gave a farewell dinner in honor of Mr. Burnett on September 9.

DR. CARL F. PRUTTON, formerly head of the department of chemistry and chemical engineering at the Case School of Applied Science, has joined the Mathieson Chemical Corp. as director of research. He will have his headquarters in New York.

R. E. "RAY" NELSON, long associated with the Naugatuck Chemical Division of U. S. Rubber Co., most recently as technical representative on colloids and plastics, is now associated with H. A. Astlett & Co., New York, in charge of the latex department.

C. K. NOVOTNY, until recently vice-president of the Lake Shore Tire & Rubber Co., is now associated with the Armstrong Rubber Co., West Haven, Conn., in a similar executive capacity.

DR. ALLEN W. SCHOLL, formerly senior research chemist, analytical division, Firestone Tire & Rubber Co., Akron, was recently named professor and head of the chemistry department of Marshall College, Huntington, West Va.

A. C. MONTEITH, engineering executive of the Westinghouse Electric Corp., has been elected vice-president in charge of engineering and research, succeeding MARVIN W. SMITH, who was recently elected vice-president of the Baldwin Locomotive Works.

LLOYD R. LEAVER, president of the Joseph Stokes Co., Ltd., Welland, Ont., has been elected a vice-president of the Thermoid Co. to handle the industrial rubber products division while continuing to direct the policies of the Canadian subsidiary from Trenton, N. J.

MISS M. T. GUNTER, who has been associated with the Pequanoc Rubber Co., Butler, N. J., for the past 47 years, most recently as secretary-treasurer, has resigned from that company. She will, however, continue as a director.

Hycar-Phenolic Molding Powder

The Compound Division of the Chemical Department of the General Electric Co., Pittsfield, Mass., has developed a new Hycar-phenolic molding powder which will provide high shock resistance characteristics to instrument cases, knife handles, power tool handles, and a variety of other applications which undergo rough treatment. The new compound, designated G-E 12446, is said to possess the good moldability and heat resistance of wood flour-filled phenolics and is strengthened by the toughness and resiliency of Hycar to a point where it can replace cotton flock and rag filled compounds for many applications. Certain tests of the new compound indicate that its resistance to impact is many times more than that of standard wood flour-filled phenolic materials. It possesses low bulk factor, excellent powder pourability, provides good finish, and can be rapidly preformed in automatic equipment.

Appointments At Diamond Alkali

Diamond Alkali Co., Cleveland, Ohio, has announced the appointment of J. C. McKenna as product manager of alkali sales, succeeding J. D. Mattern who retired recently after 25 years' service with the company. Mr. McKenna attended Fordham University and the College of the City of New York, and was formerly product manager of chromium chemical sales for the company. He has been associated with Diamond for 26 years. Succeeding Mr. McKenna as product manager of chromium sales is Charles E. Grant, assistant to the president of the Martin Dennis Co. of Newark, N. J., a recently acquired Diamond subsidiary. Mr. Grant joined the company at Painesville, Ohio, in 1945 as a project engineer, and in March of this year was transferred to the Dennis organization. He studied engineering at Pennsylvania State College.

Polyethylene Laminated Paper

Development of a new process for laminating polyethylene film to papers, which among other uses can serve as replacements or substitutes for holland cloth in the rubber field, as well as for liners, has been announced by the Floyd A. Holes Co., Bedford, Ohio. Polyethylene-laminated paper offers such properties as flexibility over a wide temperature range, complete absence of odor and taste, and non-susceptibility to humidity changes. The laminate can be furnished in a variety of thicknesses ranging from 0.001 to 0.004 inch to meet most requirements. Other uses of these special laminates include bulk packaging of hygroscopic materials; liners for cartons, barrels and tubular containers, and jar and bottle cap liners for seal pharmaceuticals, cosmetics, etc.

CARL F. TER WEELE, associated with Remington Rand, Inc., as an export division executive for the past few years, has been appointed export manager of the Farrel-Birmingham Co., Inc. He will make his headquarters in the Chrysler Bldg., New York, N. Y.

NEWLY ELECTED OFFICERS OF HARWICK STANDARD CHEMICAL CO.

J. R. Moore | Ray L. Lasser | Frank Sancic

At a meeting of the Board of Directors of the Harwick Standard Chemical Co. held at the general offices of the company in Akron, Ohio, on August 6, J. R. Moore, formerly vice-president, was elected president to fill the vacancy created by the death of Curtis J. Harwick. At the same meeting, Ray L. Lasser was elected a vice-president of the company as was L. M. Buckingham. Frank Sancic was elected secretary. Mrs. Virginia Harwick, widow of the former president, was elected into the directorate as Chairman of the Board and will participate actively in the direction of the company, serving also in the capacity of treasurer.

Mr. Moore joined the Harwick firm in 1940 as sales manager. He began his career in the rubber industry in 1927 with the B. F. Goodrich Co. where he served under Dr. Webster Jones in compound development and control. He is well known throughout the chemical trade and is a member of the American Chemical Society. He received his degree in chemistry from Miami University in Oxford, Ohio.

"Operating policies," said Mr. Moore, "will remain the same as formulated and adopted by Mr. Harwick during his lifetime, and the business of the company will continue with the same personnel in the Akron offices, as well as in its Boston, Trenton, Chicago and Los Angeles branches."

Rayon Cord From Beechwood Pulp

Development of a process for manufacturing high-tenacity rayon from beechwood pulp will save the combined zones rubber industry in Germany approximately $1,500,000 in imports this year. Beechwood rayon, used in the manufacture of tire cord, has undergone extensive mechanical and road tests during the past year, and has been found to be superior to conventional cotton thread used at present by German tire manufacturers. The pulp is produced by the Waldhof Fabrik at Mannheim, while the rayon is spun at the Glanzstoff Fabrik in Obernburg. Present production capacity in the combined zones is about 500 tons of the new pulp monthly, slightly less than the requirements for the 1948 tire production goal which is 120,000 tires monthly.

N. J. Plant to Produce Orlon

A new plant, to be constructed approximately one and one-half miles from Camden, N. J., by E. I. du Pont de Nemours & Co., will be given over to the production of Orlon, trade name for the company's synthetic textile fiber previously known to the trade as "Fiber A." Manufactured in a pilot plant by the acetate division of the company at Waynesboro, Va., the present output is said to be limited to 7,000 pounds per month. At the proposed new plant, Orlon will be produced on a much larger scale, company spokesmen said.

Akron Plans Rubber Street

City officials of Akron, Ohio, have announced plans to resurface a main Akron street with a mixture of crumbled synthetic rubber and asphalt black top. Small sections of two city streets were paved with the same materials about a year ago. It has stood up so well that city officials and the Goodyear Tire & Rubber Co. will team up to give it a try-out on a main thoroughfare. Goodyear is supplying the synthetic at no cost. In crumb form, it will be taken to the mixing plant and combined with asphalt. The blending is done at a temperature of about 170° F. Then the mixture is transported to the job to be rolled down as the new paving surface. Both England and Holland have been using the synthetic rubber-asphalt combination for years with some success.

General Sets New Sales Mark

The General Tire & Rubber Co., Akron, Ohio, has reported third-quarter sales for its fiscal year of $31,185,104, the best record in the 33-year history of the company. Sales were 6.8% greater than for the third quarter of 1947, and 57% greater than the average of third quarter sales for the last five years. William O'Neil, president of the company, predicted an increasing volume of sales for the rubber industry, quoting population increase, decreased truck hauling costs, and decentralization of industry as factors that will increase demands for tires.

FINANCIAL NEWS

GOODYEAR TIRE & RUBBER CO. REPORTS NET OF $14,191,648

Goodyear Tire & Rubber Co. has reported record peacetime sales for the six months ended June 30, 1948, with sales reported at $346,079,544, compared with $316,467,215 for the first six months of 1947. Net earnings for the period amounted to $14,191,648, after a $3,000,000 reserve for possible losses in connection with foreign investments. This net is equal to $6.16 per share of common stock outstanding and compares with $11.601,416, or $4.90 per share of common stock in the first six months of 1947 after a $2,000,000 reserve had been set aside.

P. W. Litchfield, chairman of the board, told stockholders that all plants of the company are continuing capacity operations. Reviewing Goodyear's foreign operations, Mr. Litchfield said the company's equity in fixed and current assets outside the U. S. consolidated in the June 30 balance sheet amounted to $51,119,000. In respect of this investment there has been provided from prior years' earnings a reserve of $12.500,000.

Foreign earnings for the half year consolidated in the income account totaled $8,575,000. After providing for additions to foreign properties and necessary increases in foreign working capital, there was a balance for remittance home of $5,900,000, of which $2,900,000 had been received by June 30. The reserve of $3,000,000 for the difference, provided from the first six months earnings, has been added to the company's foreign investment reserve. This now amounts to $14,550,000 after a charge of $950,000 for losses arising from the devaluation of certain Latin American currencies.

Goodyear's working capital as of June 30, last, aggregated $249,600,000 compared with $175,900,000, a year earlier. Inventories were $160,200,000 against $151,200,000, reflecting the higher volume of sales.

The consolidated balance sheet as of June 30, 1948, showed total assets of $423,277,658, as compared with $328,245,896 at the end of the 1947 period. Total current assets were listed at $301,107,730, including $28,643,878 in cash, while total current liabilities amounted to $51,490,320. This compares with $233,370,769 and $47,438,611, respectively, at June 30, 1947.

Intercontinental Rubber Co.

First Half: Net loss of $122,708, which compares with a net loss of $12,973 for the corresponding period of 1947. Sales of guayule rubber for the period amounted to $92,318, compared with $1,298,788 for the first six months of 1947. Current assets as of June 30, 1948, totaled $1,053,006, against the $1,268,409 as of June 30, 1947. Current liabilities were $28,616 and $48,337, respectively.

Thermoid Company

First Half: Net profit of $570,065, which is equal to 70 cents each on 716,588 common shares, and which compares with $506,060, or 72 cents a share each on 602,464 common shares for the corresponding period last year. Sales for the period were $12,656,326, against $12,488,552 for the first half of 1947. In a statement accompanying the financial report, F. E. Schluter, president of the company, stated that second half sales should be ahead of the like period last year. First half sales suffered somewhat by strikes in certain chemical companies. This situation has now been relieved. The capital expenditure program undertaken early in 1945 has largely been completed.

Columbian Carbon Co.

First Half: Net income of $3,509,540 after taxes and all charges, including a non-recurring income of $686,016, which is equal to $2.18 a share on the 1,612,218 shares of no par capital stock outstanding and compares with $3,231,259, or $2.00 a share, earned in the initial half of 1947. The consolidated balance sheet as of June 30, 1948, reveals current assets of $15,812,672, and current liabilities of $5,040,292. Current assets on June 30, 1947, were $17,454,780, and current liabilities $4,605,021.

Norwalk Tire & Rubber Co.

Nine Months to June 30: Net loss of $87,901, which includes $53,874 in tax credits, which compares with a net profit of $150,360, equal to 74c a common share, for the corresponding period last year. Net sales for the first nine months of 1948 amounted to $4,642,149, compared with $7,806,657 for the 1947 period.

Lea Fabrics, Inc.

Year ended May 31: Net income of $678,239, which is equal to $3.23 each on 209,820 capital shares, and compares with $623,187, or $2.97 each on 104,921 shares in the preceding year after giving effect to a 100% stock dividend paid on November 7, 1947.

United Carbon Company

First Half: Net profit of $1,568,806, or $1.97 a share, which compares with $1,558,594, or $1.96 a share, for the corresponding period last year.

Faultless Rubber Co.

Year ended June 30: Net profit of $448,439, which is equal to $3.42 a share, and compares with $458,411, or $3.50 a share, for the preceding fiscal year.

NET INCOME OF $11,023,446 REPORTED BY B. F. GOODRICH

B. F. Goodrich Co. has reported a net income of $11,023,446 for the first six months of the current year, which is equal to $7.64 a share of common stock and compares with $11,264,245, or $7.82 a share, reported for the corresponding 1947 period. In both periods, $2,000,000 was reserved for contingencies. The 1948 net is based on sales of $197,688,828, a drop of 1.8% from the $201,283,642 volume in the 1947 period.

According to the consolidated balance sheet as of June 30, 1948, the company had total assets of $257,803,227, which compares with $243,437,631 on June 30, 1947. Current assets amounted to $176,510,067, including $20,730,453 in cash, $402,400 in securities, and $98,511,387 in inventories. Current liabilities were $35,569,054, after deducting U. S. Treasury tax notes. This compares with $169,402,918 and $51,906,037, respectively, at the end of the 1947 period.

Baldwin Rubber Co.

Year to June 30: Net profit of $656,870, which is equal to $1.67 a share on 393,762 capital shares, compared with $855,968, or $2.72 each on 315,010 shares, the year before.

Government to Sell Rayon Holdings

Government stockholdings in both the North American Rayon Corp. and the American Bemberg Corp., now held by the Office of Alien Property, will be put up for sale around October 15, ending Government control of the two firms. Engineering surveys have been completed, and prospectuses on the two companies will be filed with the Securities and Exchange Commission by October 1. Still to be decided is what types of prospective buyers will be excluded from bidding on the properties. Two-thirds of the customers of the two firms are small converters, and the Government is anxious to assure these small firms of continued supplies of goods.

Acquires Laboratory Equipment

High bidder for the rubber laboratory equipment of the Wilmington Chemical Corporation offered at public auction at Wilmington, Delaware, on July 17, was Lehigh University of Bethelehem, Penna. In turn, Lehigh University has sold the equipment to the Sid Richardson Carbon Co. of Fort Worth, Texas. The equipment included a 6x12-inch mill, a No. 0 Banbury, a curing press, and various testing instruments.

Government Guayule Project

The U. S. Department of Agriculture in cooperation with the Texas Agriculture Experiment Station has set up a new research project on guayule with headquarters at Winter Haven, Texas. The plant is under the joint supervision of the federal and state agencies.

N. Y. Holds Golf Tournament

Approximately 150 members and guests turned out for the golf tournament held by the New York Rubber Group at the Winged Foot Golf Club, Mamoroneck, N. Y., on August 24. This was the second annual tournament held by the group and like the first it was eminently successful, with the attendance almost double that of the first one. Low gross honors went to F. F. Salamon (Binney & Smith), who shot an 83, with G. W. McComb (Revertex) runner-up with an 87.

Winners of the "hole-in-one" contest on the 7th green included E. Engdahl, W. S. Woodward (American Zinc Sales) and R. H. Eagles (Huber), these three being closest to the pin on the hole. The putting contest was won by W. H. Winans (Southeastern Clay), J. H. Nesbit (U. S. Rubber Reclaiming) and John Snyder (Binney & Smith), all of whom covered the course in 34. Prizes in the kicker's handicap, set at a net of 70 to 80, went to some two dozen individuals, including Messrs. Purdington, Waters, Soule, Minnig, Callahan, Lawson, Rines, Salamon, Buffington and McComb.

Several prizes were awarded for birdies and eagles, and special prizes were provided for guests on various contests. Special prizes were also awarded to C. T. Jansen and M. E. Lerner, both of RUBBER AGE, for turning in scores of 154 each. The committee in charge of the affair included Charles T. Haynes (Binney & Smith), who substituted as chairman for the late Donald Cranor, J. H. Nesbit (U. S. Rubber Reclaiming), and E. B. Curtis (Vanderbilt).

New York Meets October 15

The next meeting of the New York Rubber Group will be held on Friday, October 15, at the Henry Hudson Hotel, 353 West 57th St., New York City. It is planned to present two papers, one on the new low temperature synthetic rubbers, including the new zero-type rubber, by Dr. W. F. Tuley, of Naugatuck Chemical, and the other on the pelletizing of raw materials for the rubber industry, by William Donahue of the Addison-Sims Corp. The meeting will start at 4:15 P.M. in the Tudor Room of the hotel, and will be followed by dinner and entertainment.

Southern Ohio To Hear Taft

W. K. Taft, pilot manager of the Government Synthetic Research Laboratories in Akron, Ohio, will address the September 16 meeting of the Southern Ohio Rubber Group at the Engineer's Club of Dayton, in Dayton, Ohio. The title of Mr. Taft's paper will be "Some Recent Developments in Synthetic Rubber."

Sperberg to Address Detroit

The October 1 meeting of the Detroit Rubber and Plastics Group will be held at the Detroit-Leland Hotel in Detroit, Mich. L. R. Sperberg of the Research Department of the Phillips Petroleum Co., Phillips, Texas, will address the group on "Carbon Black in Low Temperature Synthetic Rubber."

Krismann Named Branch Manager

Emil H. Krismann

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the appointment of Emil H. Krismann as manager of the Akron, Ohio, branch office of the Rubber Chemicals Division, succeeding Harry A. Hoffman, who will retire on October 31. Mr. Krismann has been assistant sales manager of the Rubber Chemicals Division with headquarters at Wilmington.

Born in 1902 at Connellsville, Penna., Mr. Krismann studied for three years at Kenyon College, Gambier, Ohio, before obtaining degrees in organic chemistry and chemical engineering at the University of Berlin in 1925. He came to DuPont from the Goodyear Tire & Rubber Co. in 1931. After several years in the rubber laboratory, he served in Boston, Mass., as technical representative of the Rubber Chemicals Division for New England until he became assistant sales manager in 1944. Mr. Krismann is a member of the American Chemical Society and of the Executive Committee of the Division of Rubber Chemistry. In addition, he is advertising manager of *Rubber Chemistry and Technology*.

Mr. Hoffman was born in 1883 in Indianapolis, Ind., and attended Indiana University. He came to Akron in 1910 to join the technical staff of the B. F. Goodrich Co., and during his eighteen years of service with this concern, he held various positions, including that of development manager. In 1930 he joined the Roessler and Hasslacher Chemical Co. as technical representative on rubber chemicals. He became associated with DuPont when the two concerns were consolidated in 1931. He served with DuPont as technical representative of the Rubber Chemicals Division for the Ohio area and, since its creation in 1945, as manager of the Akron Branch of the Division.

In a large scale experimental project, thousands of square yards of a newly developed Velon plastic screening cloth produced by Firestone have been raised over plantings of shade-grown tobacco in the Connecticut Valley.

Chicago Schedules Fall Meeting

The first fall meeting of the Chicago Rubber Group will be held on September 24 at the Morrison Hotel, Chicago, Ill. This meeting will be different from those held heretofore in that the dinner will be preceded by an afternoon technical session and social hour and followed by a program of entertainment. Speakers for the evening are L. R. Sperberg of the Research Department of the Phillips Petroleum Co., Phillips, Texas, who will speak on "Ultipara—Low Temperature Rubber," and George Popp, also of Phillips, who will speak on "Processing and Compounding Applications of HMP Black." Grant Halladay, naturalist and photographer, will present a film entitled "Packsacks and Paddles" as the entertainment for the evening.

Washington Holds First Outing

The first annual summer outing of the Washington Rubber Group was held on August 14 at Great Falls Park on the banks of the Potomac River near Washington, D. C. Approximately 50 members and guests attended the outing which included a picnic dinner, a softball game and other activities. The next meeting of the group will be held on September 26 at the Cosmos Club in Washington, D. C. Dr. L. A. Wood, Chief of the Rubber Section of the National Bureau of Standards, will be the speaker of the evening. Dr. Wood will speak about his recent trip to London, where he attended the Rubber Technology Conference.

Buffalo Meets September 21

The Fall Meeting of the Buffalo Rubber Group will be held on Tuesday, September 21, at the Westbrook Hotel in Buffalo, N. Y. H. B. Townsend, vice-president in charge of laboratories of the General Latex & Chemical Corp., and T. G. Cook, chief chemist of that company, will discuss the history, development and future of latex. A round table discussion will follow the talks, with particular attention given to latex problems presented by members prior to the meeting itself.

Akron Group to Hear Rising

Frank Rising, general manager of Automotive and Aviation Parts Manufacturers, Inc., an association of 400 manufacturers in 30 states, will address the Fall Meeting of the Akron Rubber Group on October 15, at the Mayflower Hotel, Akron, Ohio. During the war, Mr. Rising was a member of the War Labor Board, and the Wage Stabilization Board. He will address the group on "The Trend in Labor Relations."

Chicago offices of the C. J. Tagliabue Corp. have been transferred to Room 519, 205 West Wacker Dr., Chicago 6, Ill.

The U. S. established a record in barite production in 1947 of 884,219 short tons, according to the U. S. Bureau of Mines.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quantities of one or two bales upon request to the Sales Division of Rubber Reserve or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*
X-466-SP GR-S	U. S. Rubber, Naugatuck	6-1-48	Similar to GR-S-10. 72/28 butadiene/styrene charge ratio; 0.05 parts hydroquinone per 100 parts of monomers; Stalite antioxidant; 90-110 Mooney.
X-467 GR-S	Firestone, Lake Charles	6-23-48	Regular GR-S-AC except shortstopped with 0.05 parts hydroquinone per 100 parts of monomers; 1.50% HAC antioxidant; 40-50 Mooney.
X-468 GR-S	Goodyear, Torrance	7-14-48	Similar to Standard GR-S except 4.0 parts fatty acid soap; shortstopped with 0.2 parts hydroquinone per 100 parts of monomers; approximately 60 Mooney; somewhat low conversion.
X-469 GR-S	Goodyear, Torrance	7-14-48	Similar to Standard GR-S except 4.0 parts fatty acid soap; shortstopped with 0.2 parts hydroquinone per 100 parts of monomers; approximately 60 Mooney; low conversion.
X-470 GR-S	Goodyear, Torrance	7-14-48	Similar to Standard GR-S except 4.0 parts fatty acid soap; shortstopped with 0.2 parts hydroquinone per 100 parts of monomers; approximately 50 Mooney; somewhat low conversion.
X-471 GR-S	Copolymer, Baton Rouge	7-19-48	Copolymer of 71 butadiene-29 styrene charge ratio made at 41° F.; cumene hydroperoxide activated recipe with potassium rosin soap emulsification; 55 Mooney. Shortstopped with 0.15 parts ditertiary butyl hydroquinone per 100 parts of monomers.
X-472 GR-S	Copolymer, Baton Rouge	7-13-48	Copolymer of 71 butadiene-29 styrene charge ratio made at 41° F.; cumene hydroperoxide activated recipe with rosin soap emulsification. Shortstopped with ditertiary butyl hydroquinone; 60 Mooney; 1.25% Stalite antioxidant.
X-473 GR-S	General, Baytown	8-20-48	A mixture containing 50 ± 2 parts of reinforcing furnace black and 100 parts GR-S. Mooney equivalent to 45 ± 4 on finished unpigmented polymer. Stabilized with 1.5% PBNA.
X-474 GR-S	U. S. Rubber, Naugatuck	7-15-48	Improved X-429 GR-S Latex. Formula same as for GR-S except slightly more soap. pH 8.5-9.25. Total solids 26.5%-29.0%. Mooney of contained polymer 115-130.
X-475 GR-S	U. S. Rubber, Borger	7-15-48	A mixture containing 50 parts Philblack A and 100 parts of GR-S polymer as used in GR-S Black 1 (37 Mooney). Stabilized with 1.5% BLE.
X-476 GR-S	Goodyear, Torrance	7-28-48	Copolymer of 72 butadiene-28 styrene charge ratio made at 41° F.; cumene hydroperoxide activated recipe with rosin soap. Shortstopped with 0.20 parts ditertiary butyl hydroquinone per 100 parts of monomers. Antioxidant 1.25% BLE. Mooney 60 ± 5.
X-477 GR-S	Goodyear, Torrance	7-28-48	Same as X-476 GR-S except Mooney 50 ± 5.
X-478 GR-S	Copolymer, Baton Rouge	7-23-48	Copolymer of 71 butadiene-29 styrene charge ratio made at 41° F.; cumene hydroperoxide activated recipe with potassium rosin soap emulsification; 55 Mooney. Shortstopped with 0.15 parts dinitrochlorobenzene per 100 parts of monomers.
X-479 GR-S	U. S. Rubber, Borger	8-2-48	Copolymer of 71 butadiene-29 styrene charge ratio made at 41° F.; cumene hydroperoxide activated recipe with rosin soap. Shortstopped with 0.2 parts ditertiary butyl hydroquinone per 100 parts of monomers; 45-55 Mooney. Stabilizer 1.25% BLE. Same as X-432 GR-S except for Mooney viscosity range.

Wintrac Rock Salt Tire Treads

A new type tire tread containing ordinary rock salt which is said to give as much as 30% better traction on ice-covered slippery roads than conventional treads, has been developed by the U. S. Rubber Co. Intended for recapping worn tires for safer winter driving, the tread material, called Wintrac, consists of high quality tread stock into which thousands of pieces of rock salt have been mixed. As the tread wears down, the pieces of salt are released to form surface pores which grip the slightest road irregularity.

Offers New Technical Bulletin

The availability of a new 8-page technical bulletin describing the properties, uses and chemical reactions of Di-tert-butyl-meta-cresol has been announced by the Chemical Division of Koppers Co., Inc., Pittsburgh 19, Penna. This alkylated tar acid is of interest to the rubber, synthetic resin, petroleum, and other industries. The material not only finds direct application in rubber compounding, but is used in the production of sulfide derivatives which are effective reclaiming agents for synthetic rubber.

Organize New Rubber Company

The General Insulation & Supply Corporation was recently organized to take over and carry on the mechanical rubber goods business of the Universal Rubber Corporation. The new company is continuing operations at the former Universal plant at 960 Harrison St., San Francisco 7, Calif. Officers of the new firm include C. M. Hammond, H. J. Williams, and W. W. Hastie, who formerly operated the General Insulation and Supply Co., and Read Givens, long associated with Universal Rubber.

MacCracken Named at Lambert

Alan L. MacCracken

Alan L. MacCracken, purchasing agent of the Ohio Rubber Co., Willoughby, Ohio, since 1944, and with Goodyear for 18 years preceding that date, has been named vice-president of the E. P. Lambert Co., rubber brokers and sales representative with headquarters in Akron, Ohio. Mr. MacCracken's activities will be directed towards the sale of crude rubber and latex compounds as well as coal tar chemicals. He is a graduate of Lafayette College and Cleveland Law School, and is a member of the bar in Ohio. During his years with Goodyear, Mr. MacCracken was active in the aeronautical program, both as an airship designer and as a pilot of blimps and free balloons. During the war years he was manager of War Materials Purchasing for Goodyear.

Distributing G-E Materials

The Graybar Electric Co. has been appointed national distributor for the Resins and Insulations Materials Division of the Chemical Department of the General Electric Co., Pittsfield, Mass. The Graybar organization will augment the present distribution of General Electric insulating materials in more than 100 principal cities. All G-E insulating materials except friction and rubber tapes will be handled by Graybar. Such products as varnished cloth and tapes, insulating varnishes and compounds, paper and fibers, mica, wedges, soldering materials, cords, sleevings, cotton tapes and varnished tubings, are included.

Herron Bros. & Meyer Moves

Herron Bros. & Meyer, Inc., well-known suppliers of rubber chemicals, has moved its New York offices from 82 Beaver Street to the Empire State Building. The new telephone number is BRyant 9-1280. Considerably more space is provided in the new offices and the company will be better able to service its customers. An office in Akron is also maintained.

Offers Consulting Service

Robert D. Abbott, associated with the C. P. Hall Co. of California from 1932 until July 31 of this year, has gone into business for himself, with offices at 643 South Atlantic Boulevard, Los Angeles 22, Calif. Mr. Abbott is offering a consulting service, including technical and marketing activities, to manufacturers of raw materials designed for use in the rubber, plastics and allied industries, with particular emphasis on the Pacific Coast. At present, he is acting as technical consultant for the Marine Magnesium Products Corp., of South San Francisco, and is exclusively representing the Los Angeles Chemical Co. in the rubber field. Mr. Abbott was born in Akron on July 4, 1892, and was graduated from Cornell University in 1917 with a degree in chemistry. He joined the Miller Rubber Co. in 1918, and remained with that organization until it was absorbed by Goodrich in 1930. During his 16-year tenure with the C. P. Hall organization he helped introduce many new products to the rubber industry. Mr. Abbott is a member of both the American Chemical Society and its Rubber Division. The telephone number at the Los Angeles office is ANgelus 2-0117.

Tinius Olsen in New Plant

Tinius Olsen Testing Machine Co. moved recently to their new plant adjacent to Philadelphia on Easton Road, Willow Grove, Penna. The new plant, with its more than 100,000 feet of area all on one floor, has been planned for the efficient production of the company's line of testing machines.

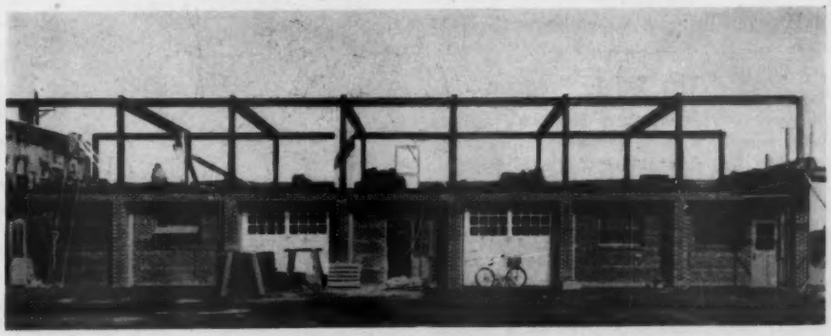
Chemical Exposition Subjects

Latest developments, discoveries and applications in industrial chemistry will be disclosed October 12 to 16 when the Chicago Section of the American Chemical Society holds its fifth National Exposition and National Industrial Chemical Conference at the Coliseum in Chicago, Ill. General subjects to be discussed at the conference include chemical market developments at the opening session of the conference Tuesday evening, October 12, and chemistry in general industry on Wednesday afternoon, October 13. Hazards from chemicals will feature the program Wednesday evening. The program for Thursday afternoon will be devoted to industrial research management. Frontiers of chemistry will be discussed on Friday morning, while pilot plant use by the chemical industry will be the Friday afternoon subject. While no program has been set for Saturday, October 16, an educational program will be arranged for high school students in order to give them some understanding of chemistry in industry.

Shell Chemical Moves Offices

The Shell Chemical Corporation has transferred its administrative offices from 100 Bush St., San Francisco 6, Calif., to 4 West 58th St., New York 19, N. Y. The Western Division sales offices will continue to be located at the Bush Street address in San Francisco. Offices of the Eastern Division remain at 500 Fifth Avenue, New York 18, N. Y., while the offices of the Export Division will be at 4 West 58th St. Barclay K. Read is now stationed at the new 58th St. offices of the company in New York.

UNITED CLAY MINES CONSTRUCTS RESEARCH AND TECHNICAL LABORATORY



United Clay Mines, Inc., is constructing a new research and technical laboratory at the company's main offices located on Oakland St., Trenton, N. J. The entire second story of the brick and steel building will be devoted exclusively to clay research and will be equipped with the most modern machinery and testing equipment. Plans are to devote further study to the development of special clays for specific applications and special industries.

All new clays under consideration from the company's deposits, as well as the daily routine testing of standard clays from producing mines, will be conducted under the direct supervision of G. W. Phelps and his assistants, J. T. Smith and J. Goodballet. English ball and China clays which are imported directly from abroad will also be tested at the new laboratory.

A complete line of clay testing machinery and laboratory control apparatus, including a complete pilot plant for ceramic work of all types; dry mixing equipment, de-airing pug mill, filter press, magnetic separator, dry press, etc., will be operated. Also, certain specialized equipment used in fundamental clay research will be installed upon the completion of the building, scheduled for early fall.

Pliovic Vinyl Copolymer Resin

The Chemical Division of the Goodyear Tire & Rubber Co. has introduced "Pliovic," said to be a somewhat different type of vinyl copolymer resin. Although Pliovic displays the inherent toughness characteristic of high vinyl copolymers, its chemical nature is such that it actually requires less plasticizer and is easier to process than most of the similar, high molecular weight materials now on the market. In addition, it has been found that Pliovic can be utilized to produce organosols which fuse with less heat than average, and the company claims that it can produce films which heat seal at lower temperatures. Pliovic is supplied as a white, granular powder which is odorless, tasteless, and which does not support combustion. It finds use in calendered film and flooring, extruded tubing and hose, and as an organosol in dipped goods and coated fabrics. Available in two grades, Pliovic A for general use and Pliovic AO for organosols, it is planned that the resin will be the parent of a new family of vinyl chloride copolymers.

British Plan Polymer Production

A new company called Styrene Co-Polymers, Ltd., has been formed in Great Britain by joint agreement between the Berger group of companies, paint manufacturers, and the Petrocarbon, Ltd.-Petrochemicals, Ltd., group of companies, the petroleum chemicals plant of which is nearing completion at Partington, near Manchester. The object of the company is to build, equip, and operate a new factory near Partington for the production of copolymers of styrene, thereby taking advantage both of the Berger styrene patents and of the Catarole process, operated by Petrochemicals, Ltd., which will produce, at low cost, industrial quantities of monomeric styrene from which the copolymers are manufactured.

General Tire Safety Program

Cooperating with the National Safety Council in its back-to-school campaign, the General Tire & Rubber Co., and its distributors across the nation, has launched an advertising campaign aimed at motorists on the theme "Give the Kids a Brake." The campaign includes highway signs, newspaper ads, motion pictures, and window display signs. The campaign will cost General more than a quarter of a million dollars, it has been estimated.

Goodrich Constructs Plant Addition

The B. F. Goodrich Co. has begun construction of a new building at its Tuscaloosa, Ala., plant for the fabrication of rubber tank lining. Company spokesmen stated that the current expansion of the chemical industry in the South makes the project a logical move. The material is widely used in chemical plants to prevent destructive reactions which cause contamination of acids stored in metal tank cars and storage tanks.

NEWS IN BRIEF

Synthetic rubber production at the Government-owned plant at Houston, Tex., operated by Goodyear, recently passed the 600,000,000 pound mark.

Led by shipments of truck and bus casings, U. S. domestic exports of rubber, allied gums and manufactures amounted to $11,765,619 in July, 1948, the Rubber Division, Office of Domestic Commerce, Department of Commerce, reported recently.

Midwest Rubber Reclaiming Co., East St. Louis, Ill., has issued a bulletin on "Prices and Analyses of Midwest Reclaims."

"Water Dispersible Colors for Use in Latex" is the title of a technical bulletin recently issued by the DuPont Rubber Chemicals Division. Ask for Report No. 48-6.

The 1949 Model C. D. truck tire, said to feature the thickest and toughest tread ever used on a General tire, is now in production. It is designed and engineered for the new Greyhounds.

A new bulletin (C-8-103) listing all of the products offered for sale by the division has been made available by the Chemical Division of Koppers Co., Inc., Pittsburgh 19, Penna. The structural formula of each product is shown, together with brief information on properties, uses and reactions.

DuPont Rubber Chemicals Division has made available a technical bulletin (No. BL-226) on "Neoprene-Resin Mixtures." The compounding and processing of such blends is discussed and test results given on typical compounds.

Chemicals Division of the Golden Bear Oil Co., Oildale, Calif., has made available reprints of an article entitled "Semi-Ebonites," which originally appeared in *India Rubber World*.

Carboline Co., St. Louis 8, Mo., has developed Carbo-Kote, a corrosion resisting coating, which may be used on rubber, wood, carbon and Fiberglas.

Pikes Peak Aluminum Foundry, Inc., Colorado Springs, Colo., is now producing cast aluminum industrial wheels featuring split-type construction which are cast in permanent molds from new ingots.

First shipment of conveyor belting for the seven-mile long transport system which will haul raw materials in building Bull Shoals Dam has been received from Goodyear at Flippin, Ark., site of the project.

Fourteen miles of rubber stair treads covering more than 20,000 individual steps have been installed in Herman Gardens, Detroit, Mich., world's largest two-story housing project. The treads were manufactured by U. S. Rubber.

Fewer Casings Produced in July

Shipments of passenger casings during the month of July amounted to 6,559,976 units, an increase of 1.22% over June when 6,480,927 units were shipped, the Rubber Manufacturers Association reported recently. Production of passenger car casings in July amounted to 5,516,349 units, down 12.41% from the June figure of 6,297,996. The reduced production caused inventories to drop 11.47% to 8,253,829 casings from 9,323,461 the previous month. Shipments of truck and bus casings during April amounted to 1,305,968 units, down 2.96% from the 1,345,758 units shipped in June. Production was off 10.15% to 1,155,797 casings against 1,286,309 units in June while inventories decreased to 1,952,751 units from the 2,111,699 held at the end of June.

Heyden Acquires Rumford Chemical

Heyden Chemical Corp., New York City, has acquired the assets of the Rumford Chemical Works, Providence, R. I. B. R. Armour, president of Heyden, and A. E. Marshall, president of Rumford, announced that Heyden and Rumford had entered into an agreement pursuant to which Heyden would acquire all of the assets of Rumford in consideration of the assumption of all Rumford's liabilities and the issuance to Rumford of 99,438 shares of Heyden's common stock. While the agreement has been approved by the board of directors of both companies, it is subject to the approval of Rumford stockholders who meet on September 27. Rumford manfactures and distributes chemicals and foodstuffs, primarily phosphate chemicals and baking powders.

Super Sure-Grip Tractor Tire

Goodyear Tire & Rubber Co. has introduced a new rear tractor tire as a result of field tests with 26 designs and patterns of tires under all type of soil conditions. Named the "Super Sure-Grip," the tire embodies 6 major improvements as compared with previous tractor tires made by the company. Tread width has been increased to provide broader contact with ground surfaces, adding up to greater drawbar pull for the tractor. Longer tread bars with increased bar depth are said to supply full depth bite for the full length of the bar. These and other features of the Super-Sure Grip have been combined with the time proven qualities of its predecessor, the Sure-Grip. Sizes range from 6-24 to 15-32, including the popular 9-38 and 13-38 sizes.

A.S.M.E. Meets in New York

The 1948 Annual Meeting of the American Society of Mechanical Engineers will be held at the Pennsylvania Hotel in New York City from November 28 to December 3. The meeting will coincide with the 1948 Power Show which will be held in the Grand Central Palace. All divisions of the society are planning technical sessions, including the Rubber and Plastics Division.

Named Assistant Sales Manager

Clement O. Davidson

Clement Olmsted "Pete" Davidson, associated with the Binney & Smith Co. since 1936, has been named assistant sales manager of the Carbon Black Division of the company. Mr. Davidson was born on February 12, 1910, and graduated from the Sheffield Scientific School of Yale University with a B.S. degree in 1933. After working with Standard Oil Co. of N. J., he joined Binney & Smith in 1936 as a salesman calling on accounts along the Eastern Seaboard and part of the South. Mr. Davidson was on active duty in the Navy from May, 1941, until November, 1945, with the rank of Commander. Upon his return from the Navy, he rejoined Binney & Smith.

S/V Sovaloid A Special

Development of S/V Sovaloid A Special, said to be a highly efficient plasticizing oil for many compounds of natural rubber, neoprene and GR-S, has been announced by the Chemical Products Department of the Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y. Company officials stated that the new petroleum product, which has a bright, clear, amber color, is more resistant to discoloration than any other general-duty plasticizer now in use in the rubber industry and produces tight, snappy vulcanizates with excellent aging qualities. In addition, the product has no effect on cure, and provides good dispersion of the fillers which are used in rubber compounding. S/V Sovaloid A Special has a comparatively low viscosity and pours freely at below-zero temperatures.

Industrial Rayon Raises Prices

Industrial Rayon Corp., Cleveland, Ohio, recently announced price increases averaging 9% for textile rayon and 4% for tire rayon products. Price increases were attributed to reflected cumulative increases in material costs and wage rates. Price increases for tire yarn, cord and cord fabric, effective September 1, range from 2 to 3 cents a pound and represent the company's first increase for these products since February, 1947.

Goodyear Shifts Plant Managers

New managers have been named for plants of the Goodyear Synthetic Rubber Corporation at Houston, Texas, and Torrance, California. Paul S. Shoaff, formerly manager of operations at Torrance, but who has been acting in like capacity at the Houston plant, returns to Torrance. He is succeeded at the Texas operations by William E. Forster, former superintendent of the Goodyear Tire & Rubber Company operations in Venezuela. Mr. Forster has been at Houston working with Shoaff for several months. Both executives have had long and varied experiences with the Goodyear organization, in domestic and foreign operations. Mr. Shoaff joined the Goodyear organization in 1922, and Mr. Forster in 1935. Mr. Shoaff was on several occasions assigned to plantations work in the Far and Middle East, while Mr. Forster's foreign experience has been in South America. The Torrance plant manager is a graduate of the University of Southern California, and Mr. Forster was graduated from Iowa State College.

English Rubber Footwear Plant

The Greengate and Irwell Rubber Co., Ltd., which employs over 4,000 people in its factories in the Manchester district, Glasgow and London for the manufacture of rubber goods and articles, has opened a new rubber footwear factory at Black Lane Works, Ainsworth Road, Radcliffe, Lancaster, England. The new factory is already producing several thousand pairs of shoes a day. The company's rubber footwear factory at Greengate, Salford, was largely destroyed by enemy action during the war. However, it was given first aid repairs and still continues the production of rubber footwear next to the company's garment works, rubber spreading works, and cable works.

LABOR NOTES

Production workers have been called back to the plant of the Sun Rubber Co. in Barberton, Ohio. The union called off its strike on September 3 after 120 days, longest in the history of the Akron rubber industry. Terms included an 11-cent-an-hour increase.

Workers of the Fremont Rubber Co., Fremont, Ohio, approved the American Federation of Labor as their bargaining agent at a vote held on August 12. The vote was 184 to 54.

Members of Local 6, United Rubber Workers, have accepted an 11-cent-an-hour pay increase offered by the Mohawk Rubber Co. The increase, accepted on August 9, is retroactive to July 1. Workers with 15 years or more of service will receive three-week vacations with pay.

A one-week strike of 3,300 employees at Manhattan Rubber in Passaic, N. J., was ended on August 17 pending arbitration of a wage dispute by a three-man panel. The union requested a 11-cent-an-hour increase and the company offered 9 cents.

McKeefery Joins Sindar Corp.

R. J. McKeefery

R. J. McKeefery, who has been associated with the Sindar Corp. and its associate company, Givaudan-Delawanna, Inc., since August, 1946, where he was formerly engaged in technical sales service, has joined the sales staff of the Sindar company. Mr. McKeefery will handle the sale of industrial aromatics, antiseptics, germicides, mildewcides, preservatives, stabilizers and other products in New York State, Rhode Island, New Jersey, Connecticut, and Vermont. Previous to his employment with Givaudan, he was associated with the *Oil, Paint and Drug Reporter*, a trade publication.

Monsanto Moving Lockport Plant

Monsanto Chemical Co. will move its Lockport, N. Y., plant to the company's plastic division at Springfield, Mass., in the near future. Company officials said that the move will be made to assure greater efficiency in manufacturing operations. The Lockport plant manufactures resins for the plywood industry, including urea formaldehyde, melamine formaldehyde, phenol formaldehyde, and resorcinol formaldehyde. All key personnel of the Lockport plant will be transferred to Springfield. The Merritt-Monsanto operation, which is a subsidiary of Monsanto, will remain in Lockport and will be completely unaffected by the change.

Miniature Bags for Cabot Blacks

Godfrey L. Cabot, Inc., Boston, Mass., is currently distributing an unusual advertising piece demonstrating its new system of product identification. An exact reproduction in miniature of a standard sewed carbon black bag has been filled with Cabot advertising matches. Each package is printed in aluminum ink on the face and bottom clearly showing the brand name and customer's code number. The little bags graphically portray the type of printing Cabot's new bag printing presses are able to do as an aid to customer's convenient identification of materials.

OBITUARIES

Ansley O. Blades

Ansley O. "Raz" Blades, head of the Rome Plastics Co., which he founded in 1945, and associated with the rubber industry since 1930, died suddenly in his sleep on August 12 at his home in Rome, N. Y. Born in South Byron, N. Y., Mr. Blades attended Park University in Parkville, Mo., and was graduated from Clark University, Worcester, Mass., in 1924. He was associated with a retail credit company in Boston for a few years before entering the rubber field as a chemist with the Fisk Rubber Co. in 1930. Shortly thereafter he joined with General Cable Corp. at its general research laboratory, then located in Rome, N. Y. In 1933 he was transferred to the Perth Amboy, N. J., plant, where he did a good deal of work on plastic insulation. Later, Mr. Blades went with the Rome Wire Corporation and in 1937 joined the Plastic Wire & Cable Corp., Jewett City, Conn., remaining there until 1945. After leaving Plastic Wire, he operated a rubber consulting service from his home in Rome, which included a small plastic extrusion business. In the past year or so he devoted all of his time to the operation of the Rome Plastic Co., which produced polyvinyl chloride extruded stock. A widow and two daughters survive.

William A. Corder

William A. Corder, president and treasurer of the L. A. Rubber & Asbestos Works, Inc., Los Angeles, Calif., died recently while on a vacation in Alaska. Mr. Corder was stricken with spinal meningitis while aboard ship and was flown to Vancouver, B. C., where he died. Born in San Francisco, Calif., in 1885, Mr. Corder began his association with the rubber industry in 1898 when he joined the Plant Rubber & Asbestos Works in San Francisco. In 1905, Mr. Corder moved to Seattle, Wash., where he was occupied in the same line of business. In 1916 he joined the Los Angeles Rubber Co. as president. This company later expanded to become the L. A. Rubber and Asbestos Works. Mr. Corder was also president of the Los Angeles Rubber Manufacturing Co., a subsidiary company which was organized in 1935. He was a member of the Jonathan Club, the Bohemian Club, and Al Malaikah. His wife survives.

David W. Smith

David W. Smith, vice-president and sales manager of the Pennsylvania Rubber and Supply Co., died September 3 in Cleveland, Ohio. Born in Akron, Ohio, 48 years ago, Mr. Smith was associated with rubber companies in that city and in Erie, Penna., before coming to Cleveland. His wife, two daughters and a son survive.

Raymond E. Palmer

Raymond E. Palmer, U. S. Rubber Co. engineer and project manager at the Mexico City plant of U. S. Rubber Export Co., Ltd., died on August 26, at Mexico City, Mexico. Mr. Palmer, who was 57 years old, had served for the past two years as project manager in charge of construction on an addition to the Mexico City plant. He joined U. S. Rubber in 1943 and served as mechanical engineer on an addition to the company's Fisk tire plant, Chicopee Falls, Mass., and a wartime conversion project at the Gillette tire plant in Eau Claire, Wisc. Previously he had been operations engineer for the Koppers Co. and the Stevens-Duryea Automobile Co. He founded the Palmer Steel Co., Springfield, Mass., and served as a government engineer during the early years of the recent war. Born in Fort Wayne, Ind., Mr. Palmer attended Morgan Park Academy, Chicago, Ill., and was graduated from Dartmouth College in 1911 and Massachusetts Institute of Technology two years later. He was a member of Phi Gamma Delta fraternity, the Sphinx Senior Society of Dartmouth and the American Society of Mechanical Engineers. His wife and two daughters survive.

Robert C. Tucker

Robert C. Tucker, at one time vice-president and Pacific coast manager for the Firestone Tire & Rubber Co., died recently from a heart ailment at the Good Samaritan Hospital in Los Angeles, Calif. He was 55 years old. Going to Firestone in 1918 as a salesman in Birmingham, Ala., Mr. Tucker became district manager and subsequently was transferred to Akron. Later he was transferred to the Pacific coast as vice-president and general sales manager of the Pacific coast subsidiary. In 1934, he became affiliated with the U. S. Rubber Co. and served as general sales manager for the U. S. Tire Dealers Corp. Until early this year he was associated with the General Petroleum Corp., Los Angeles, Calif.

George B. Dodge

George Bradstreet Dodge, vice-president of the American Rubber Manufacturing Co., Oakland, Calif., died recently, in San Francisco, Calif. Born in Waukegan, Ill., Mr. Dodge had been associated with the rubber industry since 1900 when he and his brother organized the Western Belting & Hose Co., which was later consolidated with American Rubber. Mr. Dodge was a member of the Engineers Club of San Francisco, and served for many years as chairman of the San Francisco Chamber of Commerce Mining Committee. His wife survives.

Wendell E. Bacon

Wendell E. Bacon, eastern technical representative for the C. P. Hall Co., Akron, Ohio, since 1946, died on July 25 at his home in Palmer, Mass. He was 50 years old. Mr. Bacon was born in Hufton, South Dakota. He was a graduate of the

University of Chicago, and had attended Massachusetts Institute of Technology. Previous to his association with the C. P. Hall Co., he was assistant to the development director of the Passaic, N. J., plant of the U. S. Rubber Co. From 1929 to 1934 he was in the Control Division at the Detroit, Mich., plant of U. S. Rubber. From 1934 to 1941 he was a chemical engineer at the Monson, Mass., plant of the Church Manufacturing Co. Mr. Bacon was a member of numerous fraternal and technical organizations, including the ACS, and a member of the New England Teaching Committee of the Baha'i faith. Funeral services were conducted in Palmer on July 28. The Baha'i service was followed by the Masonic service. Burial was in Hillcrest Cemetery, Springfield, Mass. He leaves his wife and daughter.

Lyle M. Geiger

Lyle M. Geiger, director of research of the Neville Co., Pittsburgh, Penna., was drowned on August 19 while fishing in a mountain stream near Grants Pass, Ore. He was 35 years old. Mr. Geiger joined the company in 1936 upon his graduation as a chemical engineer from Lehigh University and was named director of research in 1944. For the past year and a half, Mr. Geiger had been located in Los Angeles, Calif., in charge of Neville's West Coast operations. He was a Shriner and a member of the American Chemical Society, Pittsburgh Paint and Varnish Production Club, the Los Angeles Rubber Group, the Chemist's Club of New York and the Sigma Xi and Alpha Kappa Pi fraternities. He is survived by his wife, daughter, stepson and stepdaughter.

Emil R. Gasser

Emil R. Gasser, chief physicist and research director of the Farrel-Birmingham Co., died at his home in Buffalo, N. Y., on September 5. He was 44 years old. Mr. Gasser was born and raised in Switzerland and his death occurred only a week after his return from an extended visit to that country. He was educated in schools in Schaffhausen and Zurich, and he first came to the United States in 1925, settling in Buffalo. Mr. Gasser was first employed by Farrel-Birmingham in 1928. For the past three years he was director of research activities, with headquarters at the laboratory of the company's Buffalo plant. For his work in development of propulsion gearing and related design during World War II, Mr. Gasser was awarded a citation by the Navy Department. Mr. Gasser was a member of the Society of Automotive Engineers, the American Society of Naval Engineers, the Society of Naval Architects and Marine Engineers, the American Gear Manufacturers Association, and served on a special research committee of the Navy since the end of the war. His wife and son survive.

Robert E. Clayton

Robert E. Clayton, chief chemist and superintendent of the Servus Rubber Co., Rock Island, Ill., died on August 23, at Moline Public Hospital, Moline, Ill. He was 64 years old. Born in Bangor, Maine, September 24, 1883, Mr. Clayton received a master's degree in chemistry from the University of Maine in 1907, and taught there for two years. He became associated with the rubber industry in 1909, when he joined the E. H. Clapp Rubber Co. as a chemist. In 1917, he went to the Apsley Rubber Co. where he remained until 1925. Mr. Clayton then joined the International Shoe Co. as assistant superintendent of the sole and heel plant of the company. In 1927, he joined Servus as chief chemist and superintendent. Mr. Clayton was a member of the board of directors of Augustana Research, the American Chemical Society, the Rock Island Arsenal Golf Club, and other fraternal and technical organizations. Funeral services were held on August 25 in Rock Island. His wife, a son and two daughters survive.

Robert S. Perry, Jr.

Robert Swain Perry, Jr., assistant sales manager of the Titanium Pigment Corp., died on August 27, while on a business trip in Philadelphia, Penna. He was 50 years old. A former resident of Philadelphia, Mr. Perry made his home in Summit, N. J. He was a descendant of Commodore Perry, the hero of the Battle of Lake Erie in the War of 1812. A widow and daughter survive.

An unusual belt conveyor designed and built by Goodyear which travels two-thirds of its route over a suspension bridge inclined at a 19 degree angle is now in operation at the cleaning plant of the United States Coal and Coke Co., a subsidiary of U. S. Steel, at Gary, W. Va.

Science of Resinography

Resinography is the latest branch of science, according to a paper delivered by Dr. T. G. Rochow of the American Cyanamid Co. at the 114th National Meeting of the American Chemical Society recently held in St. Louis, Mo. The term covers the use of x-rays, electron microscopes, and other powerful instruments of modern science to determine the function of resins so that plans may be made for new and different resins and improved fabrics. The same methods have long been used to study minerals and metals in the sciences of mineralography and metallography.

Kel-F High Temperature Plastic

Commercial production in limited quantities of Kel-F, said to be an unusually stable, high temperature thermoplastic, has been announced by the M. W. Kellogg Co., Jersey City, N. J. The new plastic is a polymer of trifluorochloroethylene. Four-fifths of its weight is made up of two halogens, fluorine and chlorine. In its natural state it is colorless and transparent, although it may be blended with solid fillers and coloring agents. The product has good fabricating characteristics and may be fabricated by conventional machinery which is designed to operate in the range of 550-600° F. It may be compression, transfer, or injection molded, or extruded. Kel-F has a specific gravity of 2.1, tensile strength at 86° F. of 9400 p.s.i., elongation at break at 86° F. of 127%, and no water absorption. Characteristics of the new material, in addition to high stability, include low cold flow, usefulness over a wide temperature range, good electrical and heat insulation properties, unusual water resistance, and strong mechanical properties.

Doubling Foam Latex Production

Hewitt-Robins, Inc., has announced that it will double its production of latex foam rubber beginning September 15 to meet the rapidly expanding market, particularly in the auto industry. Thomas Robins, Jr., president of the company, stated that an $850,000 expansion to the company's Restfoam Division plant at Buffalo, N. Y., had provided the added capacity for the new production program. The new line is expected to reach full production within 60 days after September 15.

Kendall Acquires Burson Knitting

The Kendall Co., Boston, Mass., has purchased the Burson Knitting Co., Rockford, Ill., for operation by Kendall's Bauer & Black Division, Chicago, Ill. Burson Knitting is said to be the largest manufacturer of elastic stockings in the country. Ralph S. Williams will remain president of Burson Knitting, and all other personnel will also remain unchanged.

Edgar A. Holbein

Edgar A. Holbein, who retired on January 1, 1946, as a vice-president and director of the Standard Oil Co. of New Jersey, died in Bronxville, N. Y., on August 11, at the age of 67. Born in Baltimore, Md., Mr. Holbein joined Standard Oil as an office boy in that city and rose through various positions to become general manager of the Baltimore division in 1919. Transferred to New York as domestic sales manager in 1926, he was elected a director when the Standard Oil Co. of New Jersey was formed the next year. Five years later he was named a vice-president. In 1940 he was elected president of the Standard Oil Co. of Pennsylvania, continuing, however, to hold his former post. He originally retired in 1942 but returned to work for the period of the war. Mr. Holbein was president of the Maryland Society of New York. His wife, a son and daughter survive.

Albert F. Osterloh, Sr.

Albert F. Osterloh, Sr., retired rubber executive, and former vice-president and general manager of the Goodyear Tire & Rubber Co. of California, died at his home in Los Angeles on August 17. He was 75 years old. Mr. Osterloh started with Goodyear in 1902 as a salesman in Akron, and advanced until he became secretary of the company. When the California subsidiary was organized in 1919, he was made executive head. Mr. Osterloh resigned his position at Goodyear in 1926 to become president of the Industrial Foundation of America.

Louis F. Marion

Louis F. Marion, assistant secretary-treasurer of the Sun Rubber Co., Barberton, Ohio, died at his home in Barberton on August 31, of a heart attack. He was 53 years old. A resident of Barberton for the past 30 years, Mr. Marion had been in poor health for two years. Mr. Marion was Akron Commander of Knights Templar, a member of the Tadmor Shrine and past president of the Barberton Shrine Club. He had been a member of the National Lodge, FAM, and the Portage chapter, RAM, Akron council. Mr. Marion was also a past president of the Barberton chamber of commerce. His wife, a daughter and a son survive.

Bliss C. Ames

Bliss Charles Ames, retired founder of the B. C. Ames Co. of Waltham, Mass., manufacturers of precision testing machines for the rubber and other industries, died on August 18. He was 81 years of age. Born in Oxford, Maine, on May 19, 1867, Mr. Ames started in business in 1898 and retired in 1923.

General Scientific Equipment Co., Philadelphia 32, Penna., is marketing a new industrial protective mask consisting of a plastic shield, which is held in position by an adjustable elastic head band, and replaceable laminated filters of extra-thickness.

CANADIAN NEWS

Imports of natural rubber into Canada in the first 5 months of 1948 totaled 16,885 long tons, including 610 tons of latex; consumption amounted to 17,836 tons, including 386 tons of latex. Exports of crude rubber (foreign produce) amounted to 30 tons.

Production of synthetic rubber in the same period amounted to 17,030 tons, consisting of 14,139 tons of GR-S, 2,873 tons of butyl, and 18 tons of other synthetics. Consumption of synthetic rubber totaled 9,217 tons, consisting of 7,483 tons of GR-S, 1,316 tons of butyl, 371 tons of neoprene, and 47 tons of other synthetics. Exports of crude rubber (Canadian production) amounted to 6,676 tons; presumably they were synthetic rubber. Total imports of synthetic rubber were 513 tons.

Domestic production of reclaim during the period amounted to 1,959 tons, imports 4,966 tons, and consumption 6,106 tons.

Of total new-rubber consumption during the 5-month period, consumption of natural rubber constituted 65.9 percent, GR-S 27.6 percent, butyl 4.9 percent, neoprene 1.4 percent, and other synthetics 0.2 precent. For the month of May alone, the percentages, in the same order, were: 67.7, 26.9, 3.5, 1.7, and 0.2.

C. A. Sellers has been appointed manager of the Winnipeg Branch of Gutta Percha & Rubber, Ltd. The area under his direction includes the Lakehead. Mr. Sellers has had extensive experience in the company, joining in 1925 and becoming a member of the sales force some ten years later.

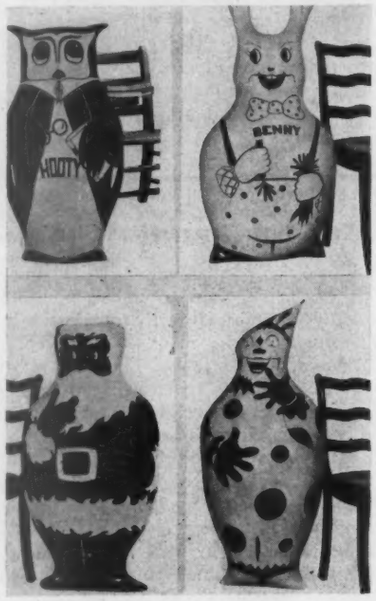
J. M. Delorme has been named manager of motor product sales of the Dominion Rubber Co., Ltd., Montreal. James S. Walker becomes manager, manufacturers sales, of the same firm. A graduate of McMaster University, Mr. Delorme has been with Dominion Rubber since 1937. Mr. Walker joined the company in the same year.

Witco No. 30 Rubber Softener

Witco No. 30, a new rubber softener, has been introduced by the Witco Chemical Co., New York City. The product is a petroleum base softener with a viscosity of approximately 90 seconds Saybolt Furol at 122° F. compared to about 500 to 800 seconds for older, more viscous softeners. Physical properties imparted to rubber by Witco No. 30 are said to be equal or superior to those obtained with a high viscosity softener. In smoked sheet and in GR-S, it exhibits excellent results after aging in tensile, modulus, elongation, and tear. Hardness, rebound, abrasion loss, permanent set, and Mooney and Williams plasticities parallel or better other comparable softeners, company spokesmen said.

Inflato Giant Playmates

A completely new line of Inflato Giant Playmates has been developed and introduced by Doughboy Industries, Inc., New Richmond, Wisconsin. These unique novelties, all made of Vinylite, range from 43 to 48 inches in length, with circumferences of 48 inches. The new line includes such popular characters as Benny the Bunny, Hooty the Owl, Jolly Saint Nick, and Bobo the Clown. Each novelty comes in



assorted contrasting colors, weighing approximately 7 pounds per dozen. In addition to play value, some of these inflatable playmates are natural display items, such as the Santa Claus for Christmas attention and the bunny for Easter store and window display. The company is also experimenting with the use of helium for floating display purposes. Other Vinylite characters sold by Doughboy Industries, Inc., include whales, frogs and serpents. An unusual novelty is Turbo the Jet, formed in the shape of a flying wing. Vinylite beach balls are also available.

Raynile Fabric Conveyor Belt

A new high tension fabric conveyor belt called Raynile, for jobs where belt tensions run as high as 1,000 lbs. per inch of width, has been developed by the Hewitt Rubber Division, Hewitt-Robins, Inc., Buffalo, N. Y. Made of a combination of rayon and nylon, the belt is said to offer greater strength than the standard types of cotton woven fabrics or cotton card belts. Important features of the new belt include maximum tensions almost double that offered by 48 ounce cotton fabric; excellent transverse flexibility; minimum stretch in actual operation, and field splicing made easy because of fabric construction. Reinforcement of Raynile fabric belts is accomplished by use of plies of rayon and nylon fabric suitably bonded to each other. The top cover is securely bonded to the carcass by shock absorbing and distributing cord breaker.

LOS ANGELES NEWS

Mr. and Mrs. Charles Lamb, Sr., sailed recently aboard the *S.S. Media* for a vacation in England. Mr. Lamb, who is president of the Lamb Rubber Corp., expects to be back in the United States by January.

Ray Bitters of Goodrich and Walter Boswell of the Thiokol Corp., recently took an extended vacation trip of about five thousand miles going through Salt Lake, Yellow Stone, Seattle and back down the coast.

The local office of the Witco Chemical Co. has been moved from 2465 Porter Street to 649 South Olive Street. The new office is in the recently-constructed Trans-America Building, Rooms 911 and 912.

The Aetna Manufacturing Co., 131 Whitehorn Way, Burlingame, Calif., was recently organized by H. D. Lucas for the manufacture of rubber floor tiling. The company is said to be progressing nicely and to be enjoying excellent business.

T. Kirk Hill, president of the Kirkhill Rubber Co., recently became the father of a boy. The boy has been named Thomas Kirk Hill.

Richard Newhall, formerly associated with the Cornell Newhall Laboratories of San Francisco, has joined the Franklin Rubber Co. as assistant manager.

Albert Frederico has been made vice-president of the C. P. Hall Co. of California, and will be manager of Pacific Coast operations.

Flexol Prices Reduced

Carbide and Carbon Chemicals Corp., New York City, have reduced the prices for Flexol Plasticizers 4GO, TWS, and R-1 effective September 1. The new prices are 36 cents a pound for Flexol Plasticizer 4GO in tank cars, 40½ cents a pound for Flexol TWS in tank cars, and 47 cents a pound for Flexol R-1 in drum carloads, f.o.b. South Charleston, W. Va. The plasticizers find use in products based on polyvinyl chloride resins, and are important in synthetic rubber compounds where oil resistance is required. Increased volume of production is said to make the lower prices possible.

Dipcraft Company Officers

Officers of the Dipcraft Manufacturing Co., 1238 Voscamp St., Pittsburgh 12, Penna., are Norman Tobias, president; Morris Tobias, vice president and treasurer, and Saul Tobias, production manager. The company, which was organized in July, 1946, manufactures toy balloons and specialty latex dipped goods.

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TALES WORTH RETELLING

(No. 8 of a series)

SHORTLY AFTER the entry of the United States into the World War, General John J. Pershing was equally criticized and praised by those who thought they knew as much about running the Army as he did. As is the case with most public figures, he had a hard time pleasing everyone. One of his chief critics called him to task for spending so much time on small details. Pershing replied:

> "I am doing this now, while I have time, in order that those under me will know how my mind works when I have no time to spend on minor details."

In business, attention to detail is essential for efficient operation.

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Above: The "business end" of the "Magnetic" Schuster Gage; prevents major losses of time and materials by keeping constant automatic control on thickness.

Left: The "Magnetic" Control Meter; automatically corrects the mill for any variation from required thickness, eliminates the human element.

How to control thickness continuously and accurately

Most mill men now agree that the only sure way to control the thickness of rubber, plastic, and other non-magnetic materials during processing is through CONTINUOUS GAGING. *Anything short of continuous gaging is makeshift, wasteful, expensive.*

Ideal device for continuous gaging is the "Magnetic" Schuster Gage, now a product of Pratt & Whitney. The Schuster Gage never lets the thickness pass beyond the limits without corrective action. Once installed, it is easily and quickly adjusted to the desired thickness, holds it as set right through to the end of the run. Rugged, simple; virtually no parts to wear out or be replaced.

Each installation is planned for the particular machine. Let us analyze your requirements; no obligation. Write for new descriptive literature.

PRATT & WHITNEY
Division Niles-Bement-Pond Company
West Hartford 1, Conn.

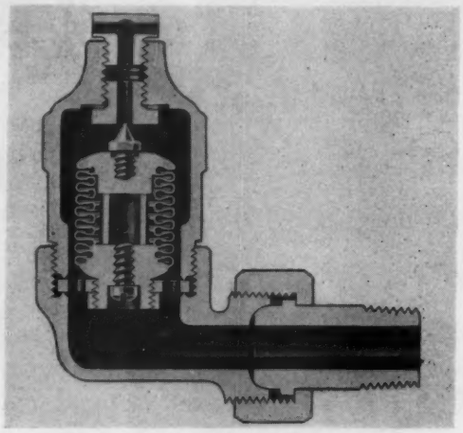
Pratt & Whitney
"Magnetic"
Schuster Gage
for positive, automatic thickness control

NEW EQUIPMENT

Air Vent for Tire Vulcanizers

Many of the "bugs" of single tire vulcanizing can be removed by rapidly and completely eliminating air from the steam jackets. Trapped air blocks free steam flow in these jackets, resulting in uneven heat transfer, and various parts of the mold are overheated or underheated. In addition, spotty vulcanization is caused by air pockets forming comparatively cool areas on the jacket surfaces.

The air vent to eliminate this problem must incorporate several conflicting features, each of which is usually



View of the Sarco Air Vent.

the chief characteristic of a different vent secured at the sacrifice of the other features. It must be very small, eliminate large volume of air, operate close to steam temperature, and it must not spit. The Sarco Co., Inc., Empire State Building, New York 1, N. Y., claims that all of these features are incorporated in its new Sarco No. 10AB Air Vent.

Specifically designed for single tire vulcanizers, the Sarco air vent is said to provide rapid elimination of all air by means of an oversized orifice made possible by a powerful thermostatic bellows. Drawn from flat bronze blanks, the heavy wall tubing of the vent is corrugated helically by a special process. With 50 p.s.i., 135 cubic feet of air can be discharged per minute.

The vent will operate at 5° below steam temperatures, meeting another requirement. No spitting of steam is assured because of three features: (1) the snap-action of the bellows, (2) the location of the body (with orifice on top) above the inlet line, and (3) the safety margin of space provided between the top of the bellows and the orifice. Only 2¼ inches in height, the vent does not interfere with the pipes, when the upper jaw is opened, or with the removal of the tire.

Although specifically designed for use on single tire vulcanizers, at the request of one of the larger tire companies, the Sarco air vent can also be employed to advantage wherever a small high pressure air vent is needed.

protected...

BY GE LIMITAMP

37 vital operations in this rubber plant

Protection of this plasticator is just one of the vital jobs done by Limitamp starters at the Fisk Tire Plant of the U.S. Rubber Company at Chicopee Falls, Massachusetts. Over a period of four years, more than thirty-seven of these units have been installed in the Fisk Plant to operate generators, mills, Banburys, plasticators—and Fisk plans to add more.

"From a maintenance point of view, I wish we had Limitamp control on all our high-voltage motors." That's what P. L. Butterfield, Chief Electrician at the Fisk Plant says about these controllers.

Decreased maintenance costs are always an important consideration. Users of this equipment have found other advantages: high-interrupting capacity, increased safety, extra-long life, complete motor protection.

You'll need more information about these starters. Fill in the coupon and mail it to us. *Apparatus Department, General Electric Company, Schenectady, N. Y.*

General Electric Company, Sect. H676-259
Apparatus Department, Schenectady 5, N. Y.

Gentlemen:

Please send me your publication GEA-4247 on the G-E Limitamp controller.

Name_____

Address_____

GENERAL ELECTRIC

DC MOLD RELEASE EMULSION NO. 35

for heavily loaded stocks

PHOTO COURTESY BETTER MONKEY GRIP CO.

"Feather Flex" floor mats are removed from silicone treated molds with the high finish and clean pattern that give added sales appeal to these automobile, home, and factory mats made by Better Monkey Grip Company of Dallas, Texas.

In molding heavily loaded stocks, you know how difficult it is to get a good surface finish without playing fireman with the spray gun. And you also know how rapidly such overspraying multiplies the cost of mold maintenance. That was the price you have had to pay, however, for quality moldings of heavily filled stocks.

Now you can get good surface finish without soaking the molds even when slow flowing stocks are used. A thin film of DC Mold Release Emulsion No. 35 gives easy release, good surface finish, and reduces the cost of mold maintenance. Molds stay clean 5 to 20 times as long because this silicone release agent does not decompose to build up on mold surfaces. Rejects are reduced to a minimum. Sales are increased by high finish and sharp detail.

That's why leading rubber companies in all parts of the world have adopted DC Mold Release Emulsion No. 35. Small shops realize the same advantages because no special equipment is required and because this silicone release agent costs no more per salable molding than ordinary lubricants.

Easily diluted with water, DC Mold Release Emulsion No. 35 is effective in concentrations ranging from 35 to 135 parts of water to 1 part of the Emulsion.

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PHONE OUR NEAREST BRANCH OFFICE OR WRITE FOR OUR NEW 16-PAGE PAMPHLET NO. C 12-V DESCRIBING DOW CORNING SILICONE MOLD RELEASE AGENTS

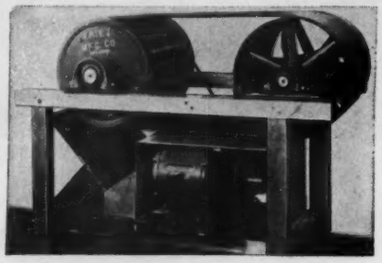
Dow Corning

FIRST IN SILICONES

Puri-Pulley Magnetic Pulley

A completely new type of magnetic pulley, known as the "Puri-Pulley," has been produced by the Eriez Manufacturing Co., 586 Commerce Bldg., Erie, Penna. The unit is non-electric and was developed solely to remove fine iron or less magnetic particles and afford automatic separation of ferrous from non-ferrous material ranging in size from ten to two hundred mesh.

While present magnetic pulleys are built to throw a magnetic field out several inches (for the removal of



ordinary tramp iron), the Puri-Pulley's strength is concentrated in close to the face plate. At one inch from the pulley's surface, the magnetic field is approximately three times as strong as a standard pulley. Design characteristics, as well as new alnico material accounts for additional strength.

The effective cleaning surface has been increased substantially by narrowing the air-gaps and increasing the number of pole plates. This provides more major areas of magnetic concentration, hence better magnetic separation. These features make the unit highly adaptable for removing fines from such materials as talcs, powders, chemicals, salts, glass sands, ball clays, granulated slag, rubber and any other substances requiring a high degree of purification. The effective cleaning range varies depending on the size of material being processed and the type of separation desired.

Designed for use as a head pulley in belt conveying systems, the unit is available in 18-inch and 24-inch diameters and in belt widths ranging from 12 to 60 inches.

FOR FURTHER DETAILS, SEE AD ON PAGE 668

to fit your purpose

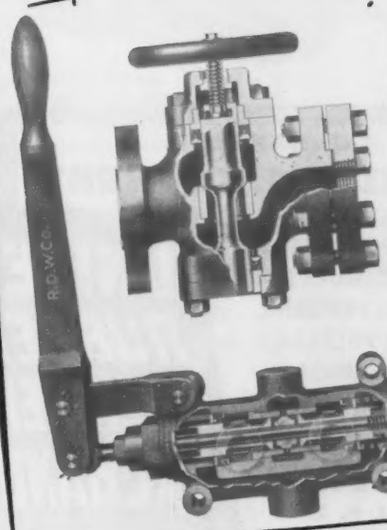
R. D. Wood HYDRAULIC PRESSES

For rugged construction, ease of operation, and low maintenance, the choice is an R. D. Wood Hydraulic Press.

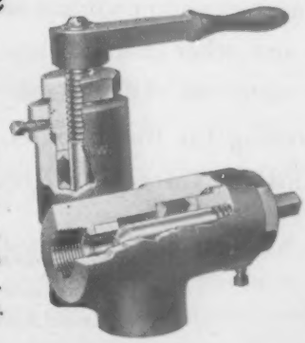
Actual performance is important, too . . . it's there that these presses excel. From the small laboratory press to the large vulcanizing and curing press, R. D. Wood Hydraulic Presses have proved their worth to the Rubber Industry by constant, efficient service. Even the finish of the R. D. Wood Heating Platens is *right* and smooth. And, whether you do vulcanizing and curing, molding, or belting there is always an R. D. Wood Press which will fit your purpose.

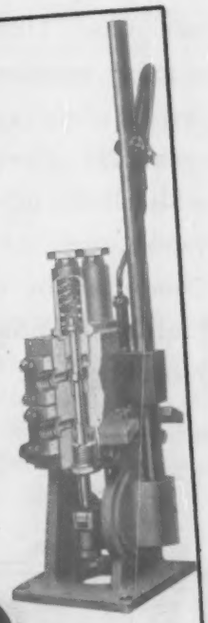
If you want more details, or engineering advice, write R. D. Wood Company.

HIGH PRESSURE VALVES
. . . with a purpose



Take a look inside . . . they're rugged. They are designed that way, throughout, and added is hardened stainless steel trim where it is needed most. Resists wear, corrosion, and erosion to an incredible degree. Easily operated even in the elevated range of high pressure hydraulic service. Send for your copy of the R. D. Wood Valve Catalog.





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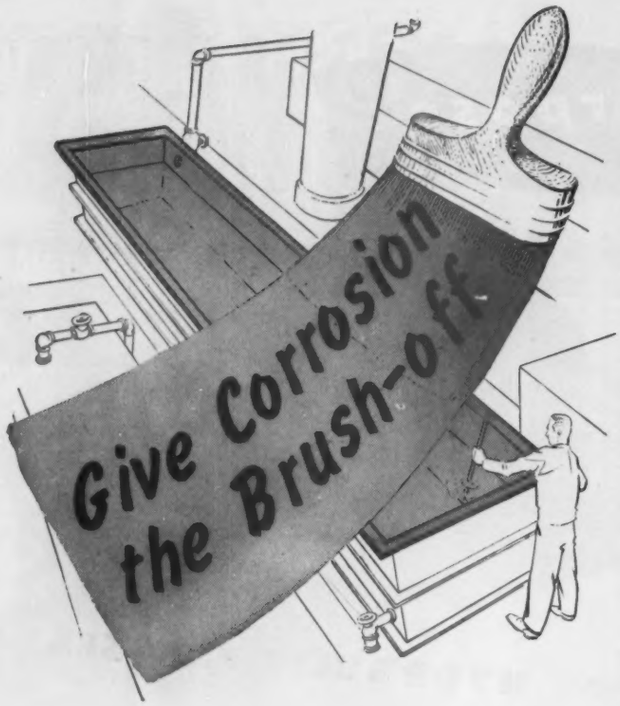


Metal equipment in your plant is easy prey for corrosion. You can lick this costly menace *only* if you are ready for it with *positive protection.*

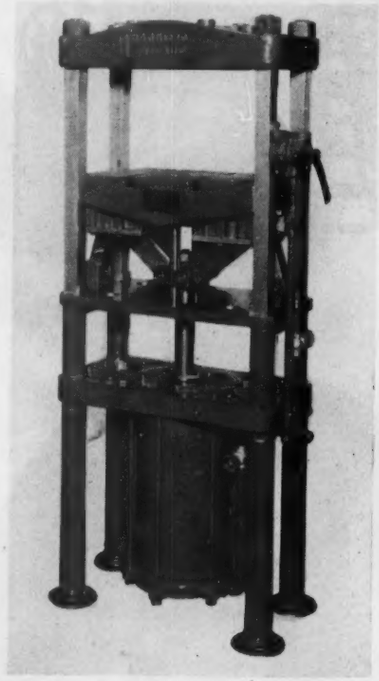
Under some of the toughest corrosion conditions known, UBS Tank Lining Compounds are today proving they make substantial savings by making valuable equipment and machinery corrosion-proof. Easily applied with a common paint brush, UBS Tank Lining Compounds cure to tough, seamless, permanently bonded coatings that are effective against a wide range of corrosive agents. If you have a corrosion problem involving acids, alkalis, oils and other chemical liquids and vapors, get the facts on UBS Tank Lining Compound by writing for free booklet, "Tank Lining Compound for Corrosion Proofing." No obligation.

Address all inquiries to the
Union Bay State Chemical Co.
50 Harvard Street
Cambridge 42, Massachusetts

UBS UNION BAY STATE *Chemical Company*

Hannifin 15-Ton Air Operated Press

A new 15-ton air operated press, which is compact and comparatively light in weight and which is said to offer new economies to rubber or plastic molding operations, has been developed by the Hannifin Manufacturing Co., 621 So. Kolmar Ave., Chicago, Ill. Called Model No. L-208, the press is adapted to both hot and



cold molding, and the operating cycle is particularly adapted to rapid production. Speeds may be regulated to suit the requirements of particular molding operations. It has an advance stroke of 5½ inches at 6,000 pounds and a power stroke of 1½ inches at 30,000 pounds. The platen is 17 inches by 14 inches in size, with 22 inches between columns. Advance speed is six times the pressing speed. The same press is also built for bench mounting.

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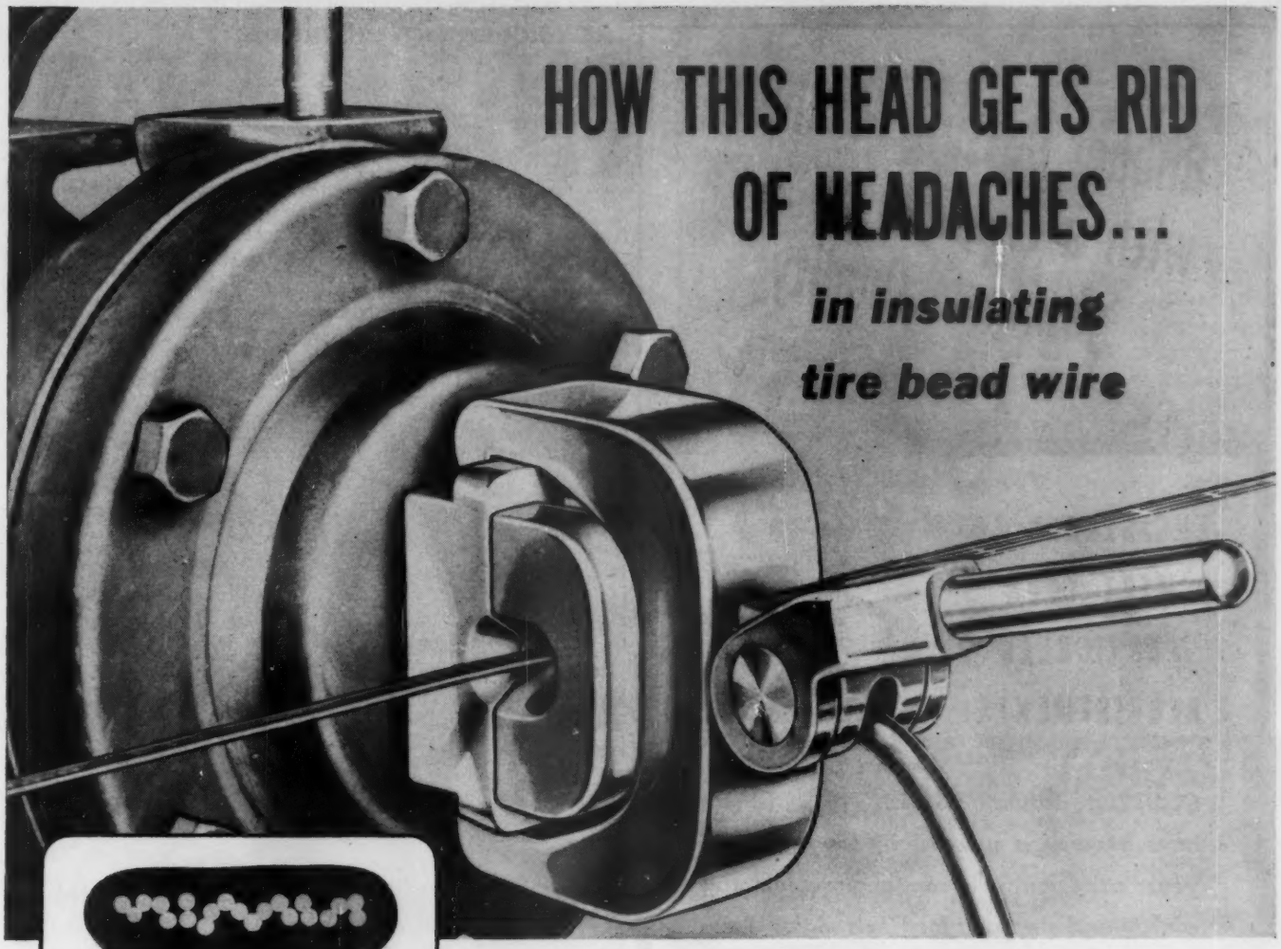
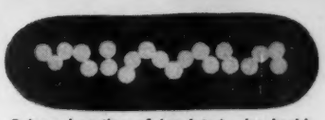
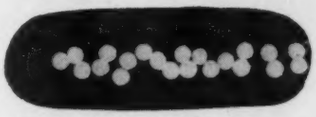


HOW THIS HEAD GETS RID OF HEADACHES...

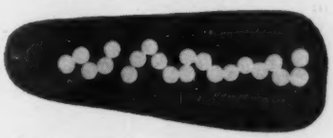
in insulating tire bead wire



Enlarged section of insulated wire braid showing balanced coverage more consistently maintained with Frazier-type head.



Typical off-balance due to stock surge which forces wire to one side of die. Thin rubber film is easily broken or removed in subsequent operations.



Excessive coverage at one edge, a result of uneven die wear caused mainly by stock surge, results in unbalanced head.

IN addition to producing wire for tires and other rubber products, National-Standard Co. for years has built bead wire insulating heads, dies and baffles for the rubber industry. Thus, complete familiarity with wire insulating problems has led to the development of National-Standard's new Frazier-type head, designed to correct the most troublesome shortcomings of conventional equipment. Here's how:

1. *The new-type head divides the stock, sandwiches the wires, lessens surge, and allows the wires to pass through the die and baffle with the least amount of disturbance.*
2. *As a result there is better control and more uniform coverage, relieving the possibility of separation due to wire exposure.*
3. *In turn, better coverage and relief of surge reduces wear on die and baffle. Thus die life is often doubled.*

The new Frazier-type head offers still other advantages. These, together with details of construction, application, available dies and baffles, etc., are shown and described in a new catalog. A copy is yours for the asking. *National-Standard Company, Niles, Michigan.*

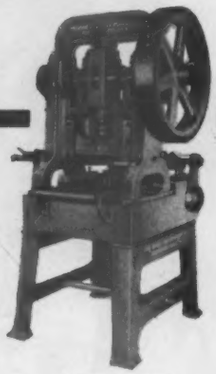
NS NATIONAL-STANDARD Company NILES, MICHIGAN

DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Lithographing and Special Machinery
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round Steel Wire, Small Sizes

Rubber Cutting Machines with a Lifetime of Uniform Quality

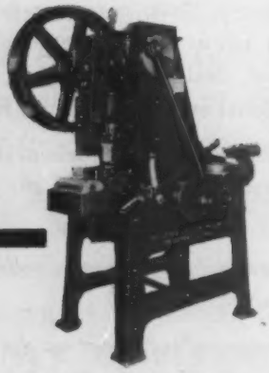
ENGINEERED TO MEET YOUR PARTICULAR REQUIREMENTS



MODEL A2

COULTER RUBBER CUTTING MACHINES have been used successfully for years and years in the cutting of continuous volumetric control and stripping for Heels, Soles, Taps and other molded products.

MODEL A1



- Model A1 for Heels at high speed production, or short runs.
- Model A2 for Multiple Heels. Half and Full Soles with stock grain.

MODEL A3

- Model A3 for Multiple Heels and Taps with or across stock grain.
- Model A2S (Not shown) for cutting crosswise of grain of stock.

PRODUCTION MACHINES SINCE 1896

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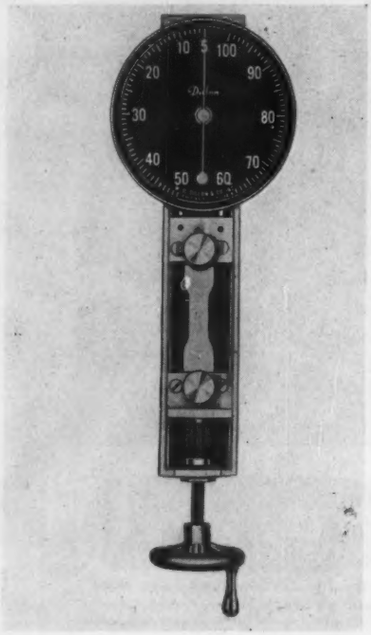

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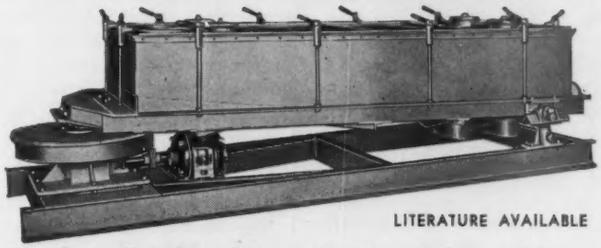

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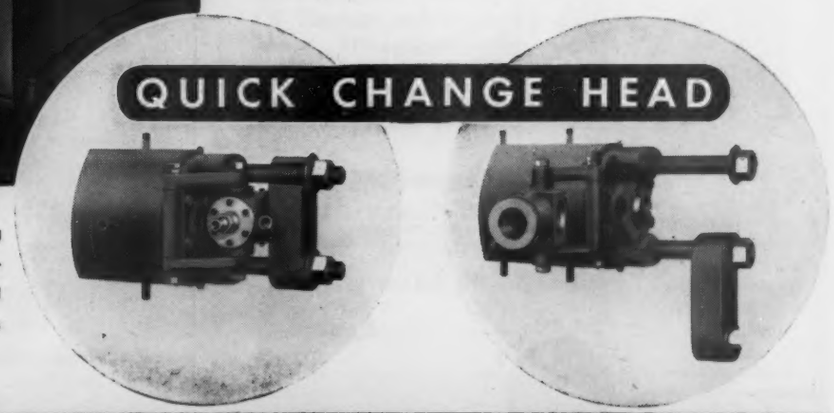

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REVIEWS

BOOKS

Modern Rubber Chemistry. By Harry Barron. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. 5-¾ x 8-¾ in. 502 pp. $7.50.

(Available from Book Department of RUBBER AGE)

Here is a welcome addition to the technical literature on rubber, particularly the manufacture of rubber products on which the literature is so sparse. Although the seasoned rubber technologist may not agree with the author's approach to some of the more complex rubber problems, such as colloidal behavior, the average rubber chemist will welcome the treatment given such problems.

What Dr. Barron has done in this book is to offer a complete manual of natural rubber, including properties, manufacture, chemistry and technology, explaining the scientific principles behind rubber manufacture as at present understood. Because the necessity for knowledge of rubber behavior has spread to innumerable other industries, he has presented the subject in easy-to-understand language, often resorting to analogies to simplify understanding. Only brief reference is made to the synthetic rubbers since, according to the author, there is a widespread lack of knowledge on the natural material and until this can be remedied "it serves no useful purpose to consider synthetic rubbers."

The book includes descriptions of rubber manufacture and processing and explains the chemical and physical properties of rubber, vulcanization, acceleration, and the relative effectiveness of the various accelerators, aging, compounding, etc. Subjects covered include the direct use of latex, the processing of reclaimed rubber, rubber reinforcement, and the production of many special articles including hard rubber, tires, hose, belting, wire and cable, etc. The chapters on the physical testing of rubber are written for direct practical use in the laboratory, covering the subject from the actual conduct of the test to the interpretation of the results.

In all, the book has 35 chapters, divided into five parts as follows: (1) General Considerations; (2) Scientific Aspects of Raw Rubber; (3) Processing of Rubber; (4) Scientific Aspects of Vulcanized Rubber; (5) Technology of Rubber. There are both author and subject indexes.

•

The Chemical Formulary: 1948. Edited by H. Bennett. Published by the Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y. 5½ x 8½ in. 448 pp. $7.00.

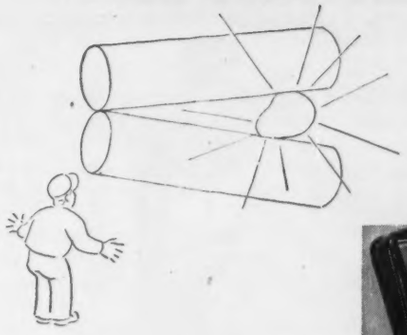
The latest volume in this series, the 8th to be issued, contains thousands of practical formulas compiled by authorities and experts in hundreds of fields. It is an entirely new book, with each formula being new and different from those in the seven preceding volumes. Like the previous editions, the current work not only furnishes the name and quality of each ingredient, but explains the steps to follow in the production of the finished material. A full chapter is devoted to plastics, rubber, resins and waxes.

•

Petroleum Production. Vol. IV. Condensate Production and Cycling. By Park J. Jones. Published by Reinhold Publishing Corp., 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 238 pp. $5.00.

Continuing the series of volumes on petroleum production, this latest book, as indicated by its sub-title, is concerned with condensate production and cycling. Latest methods and procedures are reviewed and discussed, with suggestions for possible improvement. The book is divided into two parts, the first on foundations and the second to applications. A subject index is provided.

When Lumps show up in the Calender Rolls



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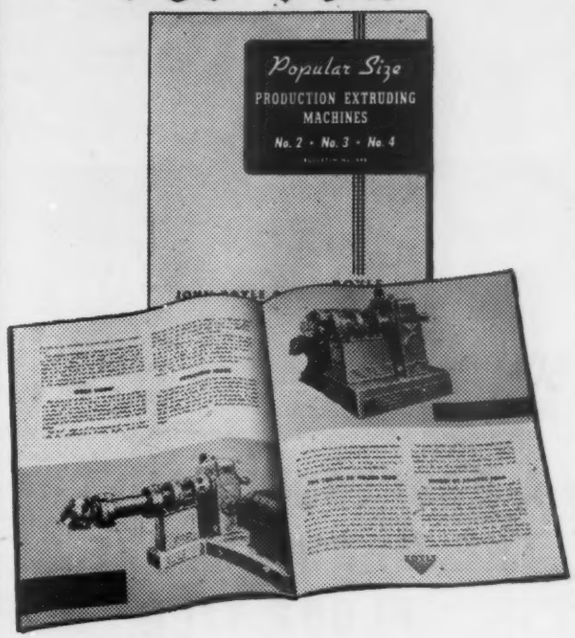

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The Chemistry of High Polymers (American Edition). By C. E. H. Bawn, Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 5½ x 8½ in. 250 pp. $4.50.

Based on a series of postgraduate lectures given in the autumn of 1946 at the University of Bristol (England), this book is addressed to those who wish to become familiar with some of the basic ideas of the physcis and chemistry of high polymers. In this sense, it is a welcome addition to the technical literature.

The technical importance of high polymers has led to the accumulation of much empirical information, while recent academic research has deepened the understanding of the polymerization process and the peculiar properties of high polymers. This book, therefore, will not only be of interest to the beginner but also to those in industry who wish to learn more about fundamental advances.

After an introductory chapter on the structure of high polymeric molecules, the problems of condensation and addition polymers are reviewed. One major chapter deals with the solid state, including the nature and structure of crystalline and amorphous polymers and their physical and mechanical properties. Other chapters deal with the kinetic and thermodynamic properties and cover in detail the methods of molecular weight and shape determination, fractionation, and molecular weight distribution.

There are seven chapters in all, as follows: (1) Introduction, Nature and Types of Polymer; (2) Condensation Polymerization; (3) Addition Polymerization; (4) Thermodynamics of Solutions of High Polymers; (5) Size and Shape of Macromolecules; (6) Structure, Stereochemistry and Crystallinity of High Polymers; (7) Structure and Physical Properties of High Polymers. The kinetic theory of rubber elasticity is reviewed in the latter chapter. A subject index is included.

•

Practical Color Simplified. By William J. Miskella. Published by the Miskella Infra-Red Co., East 73rd and Grand Ave., Cleveland 4, Ohio. 5½ x 8½ in. 114 pp. $5.00.

Issued as part of the "Practical Finishing Series" published by the company, this latest handbook covers lacquering, enameling, coloring and painting, with special attention to mixing, choosing, harmonizing, matching, lighting, testing and designation. In brief, it is a handbook for everyone interested in or using color. The patented Miskella Color Chart is contained in the book. This chart enables one to mechanically select colors, mix shades and tints, harmonize three or more colors, and avoid color discords. A subject index is included.

. . . FAST CURE WITH PHILBLACK A?

FOR FURTHER DETAILS, SEE AD ON PAGE 668

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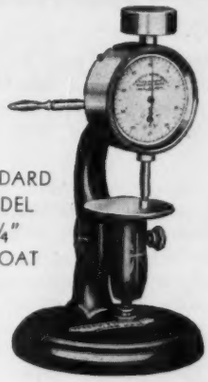

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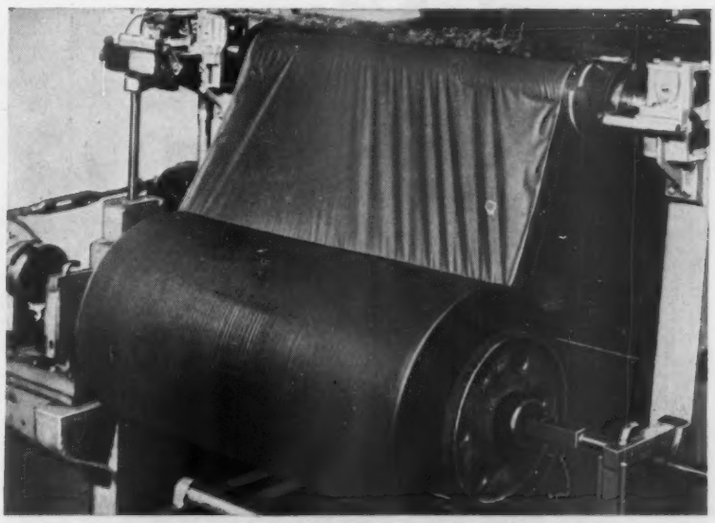
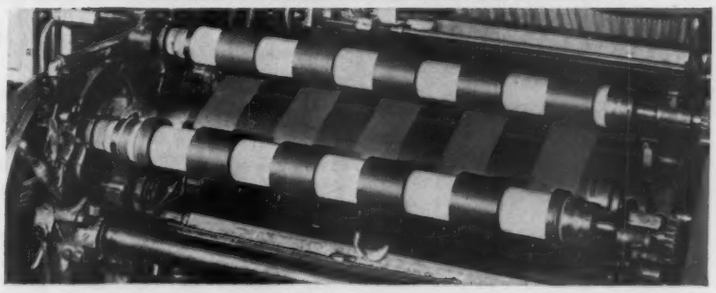


Below: using two rewind shafts for positive roll separation



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Reactivity and Structure of Dienes and Their Polymers. I. Reactivity of π-Complex Compounds. II. Synthetic and Natural Rubber. (Communication No. 76-77). Rubber Foundation, P. O. Box 66, Delft, Holland. 5-¾ x 8-¾ in. 24 pp.

Reactions involving the carbon-carbon double bond fall into two typical groups: (1) those taking place through a free radical mechanism, and (2) ionin reactions. The first of these two papers draws attention to a large group of reactions which have in common the intermediate formation of a labile complex compound. Kinetic proof of the existence of these reactive intermediates is offered and the compounds have been labled π-complexes. A detailed definition of these complex compounds is given. The second paper continues the work and evaluates the position of polyisoprenes within a broad range of polymers. Some aspects of polymer synthesis and correlations existing between dienes and polymer structure are discussed. Both papers originally appeared in the *Transactions of the Faraday Society.*

•

Influencing and Measuring Employee Attitudes. (Personnel Series Number 113). American Management Association, 330 West 42nd St., New York 18, N. Y. 6 x 9 in. 56 pp. $1.00.

This pamphlet presents discussions by Charles W. King, vice-president of the Allegheny Ludlum Steel Corporation; James C. Worthy, head of personnel research for Sears, Roebuck and Company; Lawrence Rogin, director of education and publicity for the CIO Textile Workers Union; C. F. Hawker, vice-president of the Armstrong Cork Company; and Harry Long, plant superintendent of the Minneapolis-Honeywell Regulator Company, on discovering and evaluating employee attitudes, stimulating teamwork between foremen and union stewards, getting information to employees and the public, and equipping foremen for the key role of contact between management and labor. The pamphlet also contains a union estimate of plant newspapers.

•

Twenty Years of Rubber and Plastics. A. Schulman, Inc., 790 E. Tallmadge Ave., Akron 9, Ohio. 8½ x 11 in. 50 pp.

Issued to commemorate the twentieth anniversary of the company, this booklet is virtually a pictorial journey through the nationwide organization of the company. A section of the booklet is devoted to the story of scrap rubber, and specifically to its position in World War II. Pictorial views are provided of the different Schulman plants about the country, and photographs illustrate the various operations in the preperation of scrap rubber. Attention is given to the company's plastics division, and to Schulman's activities in this field. The activities of the company's machinery division are also discussed. Useful interconversion tables of weights and measures are appended.

•

Hydraulic Presses. (Bulletins No. 285 and 286). Baldwin Locomotive Works, Philadelphia 42, Penna. 24 pp.

Including more than 50 photographs, these two bulletins describe the complete line of Southwark presses and power tools engineered and built by the company. Bulletin 285 discusses miscellaneous types of hydraulic presses ranging in capacity from 100 to 6,000 tons for high speed production and accurate forming of sheet metal parts to any desired shape. Bulletin 286 discusses standard and custom built steam platen presses for use in the fabricating of belting, brake lining, druggists' sundries, gaskets, packing, grinding wheels, insulating board, linoleum, molded rubber goods, plastic laminates, plywoods, polished plastic sheets, printing plates and mats, rubber tile and wallboard.

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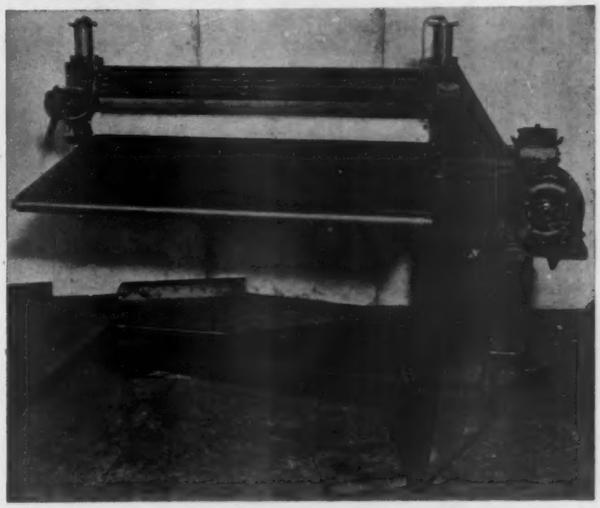

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G. B. Light Process Oil. Chemicals Division, Golden Bear Oil Co., P. O. Box 846, Oildale, Calif. 6 x 9 in. 12 pp.

Issued as the first of a series of technical reports by the company, this booklet is designed to serve as an introduction to the use of G. B. Light Process Oil. It contains basic information required for compounding with the material, including its use in natural rubber, GR-S, and neoprene, as well as in blends of natural rubber and GR-S. Specifications and properties of the process oil are outlined. A second technical report, consisting of a reprint of the article "Petroleum Products for Rubber," which originally appeared in the June, 1948, issue of RUBBER AGE, is also available from the company on request.

•

Squirrel-Cage Induction Motors. (Bulletins No. 1300-PRD-189 and 190). Electric Machinery Manufacturing Co., Minneapolis 13, Minn. 8½ x 11 in. 14 pp.

Handsomely illustrated with cutaway drawings, photographs, charts, tables and diagrams, these two bulletins outline the functions and the advantages of the company's line of induction motors. Bulletin 1300-PRD-189 concerns itself with four or more pole motors, while Bulletin 1300-PRD-190 considers the two-pole motor. Their use in boiler feed pumps, oil pipe-line pumps, centrifugal blowers and in compressors are discussed.

•

Synchronous Motors. (Bulletins No. 1200-PRD-175 and 1100-PRD-181). Electric Machinery Manufacturing Co., Minneapolis 13, Minn. 8½ x 11 in. 12 pp.

These bulletins discuss bracket and pedestal-bearing types of synchronous motors. Some of the features of the motors which are emphasized include fabricated steel frame, modern bearings, multi-layer insulation, and splash-proof and dip-proof protective construction. Application advantages and installation pictures are included. Bulletin 1200-PRD-175 covers low speed (blow 500 r.p.m.) and Bulletin 1100-PRD-181 covers high speed (above 500 r.p.m.) motors.

•

Piccolyte, the Versatile Resin. Pennsylvania Industrial Chemical Corp., Clairton, Penna. 8½ x 11 in. 8 pp.

The properties and advantages of this pale, non-yellowing terpene resin are outlined and discussed in this pamphlet. Matters of cost, yield, solubility, color and compatibility are considered. Suggested uses for Piccolyte in paint and varnish, rubber compounding, printing inks, paper coatings, adhesives, wax blends, concrete, leather and textiles are discussed. Photographs illustrate different manufacturing operations in the production of the resin.

. . . FAST CURE WITH PHILBLACK A?

FOR FURTHER DETAILS, SEE AD ON PAGE 668

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Makers of Stamford "Factice" Vulcanized Oil Since 1900
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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, SEPT 13, 1948

Natural Rubber

The price of spot rubber on the Commodity Exchange has swung in a range of 1.88 cents since our last report (August 11), high for the period being 24.00 cents on August 18, and low 22.12 cents on August 25. The average price of spot rubber for the month of August was 23.63 cents based on 22 trading days. This compares with an average of 24.24 for the month of July.

Proposed amendments to the Exchange's by-laws, recommended by the organization's rubber trade group, have been approved by the board of governors and will be put to a ballot vote of the membership. Trading in the new contract, if approved, will be started October 11, with March, 1949, as the first delivery month. The new contract is identical with the prewar trading form and provides for delivery of only one grade, No. 1 ribbed smoked sheets.

The proposed amendments would also reduce the Exchange's commission rates and floor brokerage for rubber futures contracts and provide a special rate of commission for "day" trades in rubber.

The Rubber Study Group has reported a 120,000 long ton increase in world natural rubber output during the first half of 1948. Malaya was the principal rubber exporter in the first 5 months of 1948 with 107,916 long tons. Exports by other producing countries included: Netherlands East Indies, 18,688 tons; Ceylon, 7,754; Indochina, 10,973; Belgian Congo, 1,368.

Today's quotations in the outside market, London and Singapore, follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.22⅞
October-December	.22⅝
January-March	.22¼
Thin Latex Crepe:	
Spot	.25
September	.25
Thin Brown Crepe, No. 2	.16⅞
Ambers, No. 3	.17⅛
Flat Bark Crepe	.11⅜

London Market

(Standard Smoked Sheets)

October-December	21.78 - 21.98
January-March	21.62 - 21.82

Singapore Market

(Standard Smoked Sheets)

September	20.94 - 21.04

Synthetic Rubber

(Dry Types)

Butaprene NF	.390 - .415
Butaprene NL	.400 - .425
Butaprene NAA	.440 - .465
Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50 N4NS	.400 - .470
Chemigum N3	.450 - .520
Hycar OR-25	.400 - .425
Hycar OR-15	.470 - .495
Hycar OS-10	.400 - .425
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Neoprene Type NC	—— - .250
Perbunan 18	.390 - .415
Perbunan 26	.400 - .425
Perbunan 35	.470 - .495
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

Expected improvement in the scrap rubber market after the Labor Day period was not completely forthcoming. Many plants which had been shut down for the usual vacation and inventory periods are now resuming operations, and it was generally felt that the market would soon assume a firmer tone. There have been no changes in price quotations. Current quotations follow:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$12.00
Beadless truck tires	ton	nom.
Mixed truck tires	ton.	12.00
Beadless passenger tires	ton	nom.
No. 1 passenger peelings	ton	42.50
No. 1 truck peelings	ton	42.50
Red passenger tubes	lb.	.06¼
Black passenger tubes	lb.	.03½
Mixed passenger tubes	lb.	.03¾
No. 2 truck tubes	lb.	nom.
Red truck tubes	lb.	.06
Black truck tubes	lb.	.03
Buffings	ton	15.00

Reclaimed Rubber

Demand for reclaim continues at a fairly high level. Consumption for the month of July amounted to 19,367 tons compared with 23,876 tons in June. The slump was attributed to seasonal plant shut-downs for inventory and vacation periods. It was expected that the figures for August would compare more favorably. Consumption for the first seven months of the year came to 160,071 tons. Current quotations follow:

Tires

Black, Acid	lb.	.08¾ @	.09¼
Black, Digester	lb.	.08 @	.08½
Peels	lb.	.09 @	.09½
GR-S Whole Tire	lb.	.08½ @	.09

Inner Tubes

Black	lb.	.12¾ @	.13¼
Red	lb.	.13½ @	.14
GR-S	lb.	.09½ @	.10
Butyl	lb.	.08½ @	.09

Shoe

Unwashed	lb.	.08¼ @	.08¾

Cotton Tire Fabrics

Reflecting the general trend apparent in almost all industry, demand for cotton tire fabrics lessened somewhat from previous high levels. Export demand has also slacked off to some extent and this was attributed to present world conditions, the effect of ECA on world markets, etc. The price structure for cotton tire fabrics remains substantially the same with current quotations as follows:

Standard, Peeler, 12/4/2	lb.	.7600
Standard, Peeler, 14/4/2	lb.	.7800
Standard, Peeler, 16/4/3	lb.	.8050
Extra Staple, Peeler, 12/4/2	lb.	.8575
Extra Staple, Peeler, 14/4/2	lb.	.8775
Extra Staple, Peeler, 16/4/3	lb.	.9025

Chafers

14.4 oz. (per sq. yard)	lb.	.7550
9.25 oz. (per sq. yard)	lb.	.7125
11.65 oz. (per sq. yard)	lb.	.6850
8.9 oz. (per sq. yard)	lb.	.7275

Cotton

The price of middling uplands on the Cotton Exchange has swung in a range of 1.05 cents since our last report (August 11), high for the period being 32.57 cents on August 12, and low 31.52 cents on August 23. The average price of middling uplands for the month of August was 32.23 cents based on 22 trading days. This compares with an average of 34.89 cents in July.

Washington reports state that unless factors not now evident enter the picture there will be no cotton quotas in 1949. The Department of Agriculture estimated crop production for the year at 15,219,000 bales, which is not quite 7% above the normal supply. The outlook for distribution is not too clear at the moment, with estimates ranging between 11,000,000 and 13,000,000 bales.

The ECA has increased by $8,000,000 the amount of foreign aid funds available to China for the purchase of raw cotton. Previous ECA financed raw cotton shipments from the United States to China amounted to $46,700,000. Finland, whose textile industry is currently operating at 70% of prewar, was also extended a $5,000,000 credit for the purchase of raw cotton by the Export-Import Bank.

The Sao Paulo crop was reported at 85% of last year's total, while the Chinese crop was estimated at 11,332,000 piculs of 110.23 pounds each. The Egyptian crop was estimated at 1,650,000 bales against 1,314,000 bales last year.

Quotations for middling uplands on the Exchange follow:

	Aug. 11	September 13		
	Close	High	Low	Close
October	31.23	31.27	31.04	31.11
December	31.29	31.00	30.79	30.80
March	31.32	30.79	30.64	30.64

Closing Rubber Prices on New York Commodity Exchange

FROM AUGUST 12 TO SEPTEMBER 13

Date	Spot	Dec.	Mar.	May	July	Sales
Aug. 12	23.75	21.65	21.55	21.40	21.30	50
13	23.75	21.20	21.05	20.90	21.80	53
14	——	——	——	——	——	——
15	——	——	——	——	——	——
16	22.75	20.55	20.40	20.25	20.15	86
17	23.25	21.20	21.00	21.00	20.90	100
18	24.00	21.69	21.60	21.55	21.45	61
19	23.00	20.50	20.40	20.35	20.25	50
20	22.50	20.30	20.30	20.25	20.15	104
21	——	——	——	——	——	——
22	——	——	——	——	——	——
23	22.62	20.40	20.30	20.25	20.15	67
24	23.00	20.79	20.70	20.65	20.55	51
25	22.12	20.05	19.95	19.85	19.75	130
26	22.38	20.30	20.15	20.05	19.95	62
27	23.00	20.96	20.90	20.85	20.75	56
28	——	——	——	——	——	——
29	——	——	——	——	——	——
30	22.88	20.70	20.65	20.65	20.55	44
Sept. 1	23.12	20.85	20.85	20.85	20.75	20
1	22.88	20.80	20.65	20.65	20.55	22
2	22.75	20.75	20.60	20.84	20.50	32
3	23.25	21.15	21.10	21.10	21.00	24
4	——	——	——	——	——	——
5	——	——	——	——	——	——
6	——	——	——	——	——	——
7	23.12	21.05	21.00	20.95	20.85	14
8	22.75	20.90	20.85	20.80	20.70	75
9	22.75	20.95	20.91	20.95	20.85	45
10	23.00	21.25	21.10	21.05	20.95	23
11	——	——	——	——	——	——
12	——	——	——	——	——	——
13	22.88	21.00	20.75	20.70	20.60	9

T-C

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Natural Rubber

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1903
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Represented by
HARWICK STANDARD CHEMICAL CO.
Akron, Boston, Trenton, Chicago, Denver, Los Angeles

STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS												
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,694	745,873	12.36	600,479	7,902	3,385,433	592,577
1938	397,620	125,357,730	14.07	11,878	4,147,318	15.59	2,485	623,819	11.21	411,983	5,652	1,799,124	406,331
1939	469,803	167,558,245	15.92	27,438	10,467,552	17.03	2,232	463,345	9.27	499,473	13,125	5,832,618	486,348
1940	780,820	303,117,726	17.33	33,789	14,593,466	19.28	3,634	758,007	9.31	818,243	7,060	3,197,136	811,183
1941	989,329	401,890,393	18.14	34,798	15,965,627	20.48	4,881	1,145,767	10.48	1,029,008	5,376	2,757,872	1,023,632
1942	265,980	112,377,896	18.86	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,149	10,856	5,913,386	271,293
1943	50,348	31,364,033	27.81	1,890	1,312,202	30.99	7,679	3,636,789	21.14	59,917	22,587	16,446,707	37,330
1944	103,820	73,908,389	31.78	3,091	2,092,211	30.22	6,700	3,351,233	22.33	113,611	9,739	8,712,695	103,872
1945	134,454	95,850,441	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,267	9,509	7,201,746	139,758
1947	690,964	306,919,456	19.83	17,722	9,820,080	24.91	2,880	1,492,825	20.30	711,556	4,122	2,354,494	707,434
1946:													
Oct.	45,523	24,745,403	24.27	672	438,938	29.15	691	377,319	24.38	46,886	649	613,424	46,237
Nov.	58,756	30,648,620	23.29	130	85,363	29.24	379	200,270	23.58	59,265	60	29,800	59,205
Dec.	44,159	23,810,760	23.87	2,005	1,501,336	33.43	494	265,679	24.02	46,658	17	20,625	46,641
1947:													
Jan.	92,459	51,035,472	24.64	.....	.....	....	315	169,081	23.65	.....	20	16,644	.....
Feb.	57,771	30,580,942	23.63	2,426	1,550,499	28.52	481	256,760	23.84	60,678	1,991	1,149,953	58,687
Mar.	35,128	19,421,550	24.46	496	324,103	29.15	463	246,573	23.76	36,087	39	23,592	36,048
Apr.	45,453	23,627,600	23.21	34	26,754	34.84	524	282,941	24.09	46,011	26	20,725	45,985
May	91,918	47,208,658	22.93	763	442,050	25.87	345	186,201	24.11	93,026	14	9,169	93,012
June	62,346	28,339,739	20.29	2,825	1,642,417	25.95	554	298,705	24.07	65,725	47	22,998	65,678
July	56,080	22,379,698	17.08	1,407	855,454	25.09	74	27,458	16.55	57,561	421	226,777	57,140
Aug.	43,637	16,127,766	16.93	1,784	960,877	24.48	104	24,768	18.54	45,525	191	118,666	45,334
Sept.	45,724	14,589,611	14.24	516	324,206	27.12	44	10,414	15.29	46,284	174	95,640	46,110
Oct.	46,898	14,819,306	13.11	3,081	1,370,242	19.85	....	.....	....	49,979	134	64,620	49,665
Nov.	48,952	16,962,935	15.46	1,994	1,042,644	23.13	....	.....	....	50,946	514	289,752	50,432
Dec.	69,158	24,458,323	15.21	2,438	1,280,834	23.45	....	.....	....	71,596	371	215,958	71,225
1948:													
Jan.	76,723	29,782,199	17.33	4,130	2,044,850	22.11	....	.....	....	117,906	334	206,103	117,572
Feb.	51,528	21,027,604	18.06	2,400	1,420,676	26.43	43	10,235	10.53	53,971	290	170,339	53,681
Mar.	68,848	27,902,550	18.09	3,148	1,730,014	24.02	25	6,845	10.05	72,021	467	215,156	71,554
Apr.	38,433	15,136,536	17.35	2,284	1,260,932	24.65	30	7,076	10.53	40,747	343	190,815	40,404
May	37,227	14,409,747	17.28	3,442	1,915,744	24.84	40	9,435	10.53	40,709	1,031	485,941	39,678
June	62,376	25,338,739	18.13	2,288	1,335,173	26.05	60	14,152	10.53	64,724	718	348,043	64,006

Source: U. S. Department of Commerce.
Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule.

Natural Rubber
(Including Latex and Guayule)
(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1946:				
Nov.	55,231	37,223	35	218,672
Dec.	57,620	38,802	23	237,467
1947:				
Jan.	102,080	45,328	43	294,191
Feb.	30,318	40,983	1,253	283,479
Mar.	40,437	43,104	509	280,812
Apr.	55,976	43,818	0	292,970
May	12,738	43,018	0	330,960
June	57,055	42,329	311	345,175
July	57,243	40,389	421	131,624
Aug.	44,672	47,289	191	130,040
Sept.	46,241	50,557	174	122,097
Oct.	49,340	57,286	314	114,115
Nov.	50,840	52,076	514	110,752
Dec.	71,414	56,284	371	129,038
1948:				
Jan.	80,564	58,174	334	136,227
Feb.	54,418	51,012	290	148,081
Mar.	72,070	54,444	467	130,295
Apr.	40,947	50,616	343	123,248
May	40,709	52,022	1,031	112,724
June	64,725	55,701	718	119,818
July	63,715	48,775	316	128,806

Source: 1936-40, U. S. Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.
(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1946:						
Oct.	282	367,393	21	29,307	305	216,901
Nov.	152	270,379	28	39,502	3	10,233
Dec.	199	287,167	57	41,757	26	52,096
1947:						
Jan.	183	252,580	37	29,087	36	71,252
Feb.	270	300,828	36	44,629	17	39,679
Mar.	137	158,530	190	112,132	21	28,898
Apr.	85	106,783	178	86,923	31	48,178
May	212	208,440	524	259,745	86	164,611
June	76	63,612	83	37,314	47	88,420
July	19	24,444	287	122,677	22	50,204
Aug.	151	159,338	143	78,357	19	46,667
Sept.	86	120,633	408	192,352	18	120,633
Oct.	210	389,245	352	187,255	35	88,776
Nov.	290	302,164	148	106,443	15	53,202
Dec.	172	189,934	412	240,023	42	77,371
1948:						
Jan.	56	35,973	481	289,506	69	94,854
Feb.	145	90,023	307	209,015	66	84,839
Mar.	283	189,933	436	271,314	51	101,691
Apr.	82	36,570	651	393,280	52	68,366
May	45	36,109	512	314,432	24	54,191
June	67	36,885	277	211,373	45	41,277

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1947:					
May	39,069	0	48,692	433	105,291
June	35,681	0	42,580	2,286	97,612
July	31,917	0	37,607	412	97,728
Aug.	32,901	0	39,001	585	91,288
Sept.	30,518	0	41,865	343	79,246
Oct.	33,834	0	45,668	194	67,379
Nov.	37,825	634	39,091	188	67,871
Dec.	38,134	455	43,230	358	62,366
1948:					
Jan.	39,428	1,121	43,003	416	60,290
Feb.	39,025	1,318	35,375	428	65,649
Mar.	43,940	1,769	38,222	383	72,885
Apr.	40,846	.....	34,632	563	78,722
May	42,866	.....	35,268	367	85,734
June	41,207	.....	39,204	264	89,088
July	41,275	.....	34,511	251	96,123

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1942	3,721	8,956	23	9,734	22,434
1943	182,259	33,603	1,373	14,487	231,722
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	32,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795

Consumption

1942	2,579	6,833	22	8,217	17,651
1943	131,977	26,205	304	12,405	170,891
1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666

Exports

1942	222	1,037	...	160	1,419
1943	14,937	2,540	40	631	18,148
1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	1,020	72,920
1947	7,951	2,617	62	755	11,385

Stocks at End of Period

1942	1,050	1,786	4	1,772	4,612
1943	30,975	6,415	1,035	3,143	41,568
1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,532	114,963
1947	40,606	5,237	13,184	3,339	62,366

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1941	1942	1943	1944	1945	1946	1947	1948
Jan.	46,190	49,216	36,085	47,540	52,008	51,746	57,057	61,308
Feb.	42,782	42,666	36,274	47,754	48,856	47,654	50,551	56,487
Mar.	49,572	50,820	41,586	52,263	55,364	56,703	59,947	68,171
Apr.	55,879	49,554	48,177	50,005	59,024	62,111	64,140	72,183
May	60,121	53,212	49,828	54,230	60,748	66,800	70,865	77,186
June	59,062	50,077	52,325	54,266	60,580	63,247	71,329	78,044
July	63,906	54,606	49,867	55,119	66,170	69,076	73,441	.....
Aug.	63,575	48,793	51,880	55,618	70,058	66,729	72,089	.....
Sept.	59,768	50,093	49,707	56,318	64,529	62,268	71,384	.....
Oct.	58,412	50,094	53,111	53,154	55,708	66,637	73,277	.....
Nov.	54,670	50,729	50,703	54,967	53,543	61,345	64,158	.....
Dec.	53,568	39,250	48,695	52,250	49,745	61,101	67,285	.....
Total	667,505	589,110	568,238	633,482	696,333	735,417	795,535	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1947:					
Jan.	25,545	27,715	26.6	1,443	30,053
Feb.	23,990	25,484	27.3	1,142	27,417
Mar.	26,209	26,157	26.8	1,268	31,940
Apr.	26,696	25,066	25.5	1,073	33,527
May	25,408	21,908	23.1	1,271	37,145
June	24,144	21,283	25.0	1,200	39,598
July	21,252	20,433	26.8	1,052	39,704
Aug.	21,658	21,093	24.4	1,414	40,130
Sept.	22,561	23,801	25.6	902	38,461
Oct.	25,648	26,735	26.3	1,016	36,643
Nov.	23,145	23,425	25.7	1,339	36,347
Dec.	25,123	25,229	25.4	1,437	35,943
1948:					
Jan.	25,634	25,885	25.5	768	36,307
Feb.	23,678	22,374	25.9	1,273	38,444
Mar.	24,089	24,362	26.0	937	38,313
Apr.	21,802	22,322	26.2	1,049	37,946
May	21,043	21,975	25.2	948	36,612
June	22,504	23,786	25.1	925	35,898
July	17,723	19,367	23.3	712	34,175

Source: 1936-40, Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. [a] Includes natural and synthetic rubber. [b] Includes 893 tons of imports. [c] Includes 67 tons of imports. [d] Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1930	2,784,745	571,241	3,355,986	1939	2,866,796	704,308	3,571,104
1931	1,973,090	416,648	2,389,738	1940	3,692,323	721,637	4,413,965
1932	1,135,491	235,187	1,370,678	1941	3,744,500	875,381	4,619,681
1933	1,573,512	346,545	1,920,057	1942	220,814	133,083	353,897
1934	2,177,919	575,192	2,753,111	1943	0	4,501	4,501
1935	3,252,244	694,690	3,946,934	1944	0	124,819	124,819
1936	3,669,528	781,862	4,451,390	1945	83,792	313,643	397,435
1937	3,915,889	892,382	4,808,271	1946	2,148,699	930,760	3,079,459
1938	2,000,985	485,852	2,486,837	1947	3,558,178	1,220,634	4,778,812
1947:							
Jan.	246,605	99,818	346,423	July	279,631	97,814	377,445
Feb.	267,015	105,042	372,057	Aug.	261,158	86,509	347,667
Mar.	301,525	118,234	419,759	Sept.	307,942	110,720	418,662
Apr.	314,765	106,984	421,749	Oct.	315,969	118,365	434,334
May	284,357	96,430	380,787	Nov.	305,148	87,611	392,759
June	307,124	91,810	398,934	Dec.	366,939	101,569	468,508
1948:							
Jan.	305,081	99,200	404,281	July	356,764	116,780	473,544
Feb.	274,847	107,054	381,901	Aug.	.....	.....	.....
Mar.	349,998	140,606	490,604	Sept.	.....	.....	.....
Apr.	308,071	128,963	437,034	Oct.	.....	.....	.....
May	225,461	111,789	337,250	Nov.	.....	.....	.....
June	312,406	117,572	429,978	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1943	1944	1945	1946	1947
Passenger Car	780,291	1,748,917	4,504,368	15,058,469	21,346,004
Truck & Bus	4,949,004	6,391,441	6,486,652	5,939,244	7,737,353
Agricultural	301,997	997,301	1,441,909	1,735,992	2,633,699
Earth Mover	945	703	1,308	5,520	10,610
Total	6,032,237	9,138,362	12,434,237	22,739,225	31,727,666

	1948 Apr.	May	June	July	Aug.	Sept.
Passenger Car	2,023,747	1,729,087	2,090,787	2,101,695	.....	.....
Truck & Bus	572,605	604,566	580,067	579,616	.....	.....
Agricultural	360,806	229,278	235,403	236,705	.....	.....
Earth Mover	582	897	1,317	1,066	.....	.....
Total	2,957,740	2,563,828	2,907,574	2,919,082	.....	.....

Source: The Tire & Rim Association, Inc.

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Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1936 (total)	21,446	30,866	1,073	53,385	56,041	10,717
Passenger Car.	18,941	26,999	644	46,584	49,013	9,291
Truck and Bus	2,505	3,867	429	6,801	7,028	1,426
1937 (total)	22,353	29,886	1,246	53,485	53,310	10,383
Passenger Car.	20,055	26,177	696	46,928	46,497	8,745
Truck and Bus	2,298	3,709	550	6,557	6,813	1,638
1938 (total)	11,516	30,567	1,049	43,132	40,907	8,451
Passenger Car.	10,086	27,104	580	37,770	35,789	6,937
Truck and Bus	1,430	3,463	469	5,362	5,118	1,514
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car.	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car.	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car.	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car.	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car.	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car.	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,055	62,890	3,249	91,194	95,548	6,975
Passenger Car.	19,644	52,865	1,608	74,117	77,790	5,470
Truck and Bus	5,411	10,025	1,642	17,077	17,758	1,505
1948:						
Apr. (total)	2,265	4,632	142	7,039	6,574	10,940
Passenger Car.	1,765	4,032	55	5,852	5,373	8,858
Truck and Bus	500	599	87	1,186	1,201	2,082
May (total)	1,818	4,301	136	6,254	6,931	11,611
Passenger Car.	1,373	3,698	39	5,110	5,720	9,449
Truck and Bus	445	603	97	1,145	1,211	2,162
June (total)	2,189	5,474	164	7,827	7,584	11,435
Passenger Car.	1,725	4,713	43	6,481	6,298	9,323
Truck and Bus	464	761	121	1,346	1,286	2,112
July (total)	2,379	5,357	131	7,866	6,672	10,207
Passenger Car.	1,928	4,592	41	6,560	5,516	8,254
Truck and Bus	451	765	90	1,306	1,156	1,953

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton				Rayon and Nylon [b]		
	Tire Cord Not Woven	Cord Fabric Woven	Chafer and All Other Tire Fabrics	Total	Tire Cord Not Woven	Tire Cord And Other Tire Fabrics	Total
1945:							
Jan.-Mar.	16,671	43,835	12,306	72,812	3,726	37,777	41,503
Apr.-June	16,044	42,383	13,604	72,031	4,064	42,476	46,540
July-Sept.	15,136	38,158	14,122	67,416	3,549	42,606	46,155
Oct.-Dec.	15,514	36,442	13,573	65,529	*a*	47,734	47,734
Total	63,365	160,818	53,605	277,788	11,339	170,593	181,932
1946:							
Jan.-Mar.	17,128	39,377	15,245	71,750	*a*	51,208	51,208
Apr.-June	19,622	40,197	18,623	78,442	*a*	52,511	52,511
July-Sept.	17,279	39,259	18,787	75,325	5,102	46,932	52,034
Oct.-Dec.	20,660	42,668	21,708	85,036	5,858	50,589	56,447
Total	74,689	161,501	74,363	310,553	10,960	201,240	212,200
1947:							
Jan.-Mar.	21,972	49,377	21,815	93,164	5,322	52,059	57,381
Apr.-June	23,491	53,746	16,480	93,717	5,486	47,360	52,846
July-Sept.	15,571	44,291	14,596	74,458	6,161	51,719	57,880
Oct.-Dec.	18,183	48,532	17,762	84,477	6,550	55,078	61,628
Total	79,217	195,946	70,653	345,816	23,519	206,216	229,735
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	*a*	60,569	60,569
Apr.-June	.....	.....	.....	.....	.....	.....	.....
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: U. S. Bureau of the Census.
Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1936	21,514	32,188	721	54,423	57,036	10,945
1937	22,464	29,554	749	52,767	52,373	10,312
1938	11,515	28,134	644	40,293	37,848	8,166
1939	18,190	31,998	1,062	51,190	50,649	7,036
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	n.a.	n.a.	n.a.	13,958	12,568	5,742
1943	6,183	12,373	176	18,732	15,260	2,584
1944	6,461	19,739	190	26,390	26,750	2,823
1945	6,119	33,161	408	39,688	41,102	3,671
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,039	49,107	2,496	76,641	75,509	8,089
1948:						
Jan.	2,327	2,745	81	5,152	6,226	9,116
Feb.	2,019	2,382	104	4,505	4,980	9,657
Mar.	2,363	2,731	94	5,188	5,534	9,930
Apr.	2,264	3,456	88	5,807	5,578	9,737
May	1,814	3,516	89	5,419	5,702	10,069
June	2,218	4,421	107	6,745	6,716	9,939
July	2,365	4,365	78	6,807	5,750	8,760

Source: The Rubber Manufacturers Association, Inc.
n.a.—Not available.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1929	26⅞	15½	20.55
1911	184	114	141.30	1930	16½	7½	11.98
1912	140	108	121.60	1931	8⅜	4¼	6.17
1913	113	59	82.04	1932	4¼	2½	3.49
1914	93	56	65.33	1933	9⅞	2⅜	5.96
1915	79	58½	65.85	1934	15⅜	8¼	12.92
1916	102	55	72.50	1935	13¾	10½	12.37
1917	90	52	72.23	1936	23	13½	16.41
1918	70	40	60.15	1937	26⅞	14	19.39
1919	57	38½	48.70	1938	17⅞	10¼	14.64
1920	56½	16	36.30	1939	24	14⅛	17.57
1921	21¾	11½	16.36	1940	24	18¾	20.10
1922	28⅜	13⅜	17.50	1941	24⅞	19½	22.40
1923	37½	24¾	29.45	1942	22½	22½	22.50
1924	40⅜	17⅜	26.20	1943	22½	22½	22.50
1925	121	34¾	72.46	1944	22½	22½	22.50
1926	88½	36¾	48.50	1945	22½	22½	22.50
1927	41¾	33	37.72	1946	22½	22½	22.50
1928	41¾	17	22.48	1947	25	14	20.00

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1941	1942	1943	1944	1945	1946	1947	1948
Jan.	10.66	19.85	21.34	20.76	22.36	25.49	32.58	36.09
Feb.	10.87	20.05	21.61	21.34	22.29	26.57	33.91	33.63
Mar.	11.08	20.42	21.98	21.65	22.43	27.52	35.89	35.04
Apr.	11.48	21.10	22.02	21.71	21.88	28.40	35.89	38.10
May	12.97	20.88	21.97	21.63	23.30	28.17	36.51	38.57
June	14.66	19.78	21.92	23.31	23.42	29.89	37.83	38.12
July	16.55	20.27	21.46	22.33	23.27	34.11	38.03	34.89
Aug.	17.06	19.45	21.09	22.11	23.10	36.31	34.83	32.23
Sept.	17.94	19.62	21.10	22.10	23.25	37.59	32.21	....
Oct.	17.31	19.79	21.00	22.32	23.85	36.79	32.39	....
Nov.	17.21	20.21	20.32	22.13	24.71	31.50	34.50	....
Dec.	18.09	20.55	20.32	22.28	25.21	33.03	36.74	....
Average for Year	14.66	20.16	21.34	21.89	23.25	31.28	35.11	....

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins [b]	Molding and Extrusion Materials [b]	All Other [b, c]
1946	52,080	11,673	61,852	27,083
1947	66,430	17,237	73,114	27,064
1947:				
Nov.	7,246	1,680	5,760	2,155
Dec.	8,094	2,183	7,829	2,298
1948:				
Jan.	7,785	2,414	7,823	1,531
Feb.	5,980	2,102	7,601	1,951
Mar.	7,537	3,053	6,767	1,680
Apr.	7,468	2,938	6,725	2,066
May	6,351	2,318	5,680	1,597
June	7,194	2,089	4,312	1,594

Source: Bureau of the Census.
Notes: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting; (b) Resin content; (c) Includes Adhesives, but excludes data for protective coating resins.

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Rubber Industry Employment, Payrolls, Wages and Hours

Employment — Thousands of Production Workers and Index (1939 = 100)

	1947				1948			
	All Rubber Products		Rubber Tires & Tubes		All Rubber Products		Rubber Tires & Tubes	
Month	Number	Index	Number	Index	Number	Index	Number	Index
Jan.	240	198.8	110	235.5	210	173.5	114	209.2
Feb.	240	198.2	109	233.3	208	172.0	112	205.8
Mar.	238	196.5	108	231.4	204	168.9	109	200.7
Apr.	234	193.5	106	227.0	198	163.8	105	192.9
May	223	184.5	102	220.0	195	160.8	103	190.4
June	207	170.9	118	217.0	195	161.3	...	....
July	200	165.1	115	212.3	...	....	...	....
Aug.	203	167.9	117	214.9	...	....	...	....
Sept.	203	168.1	113	207.5	...	....	...	....
Oct.	208	171.7	114	211.0	...	....	...	....
Nov.	210	174.0	115	212.2	...	....	...	....
Dec.	212	175.3	115	211.7	...	....	...	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January-May, 1947, will be shown later.

Payrolls — Production Workers Pay Rolls Unadjusted Index (1939 = 100)

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	290.1	272.6	386.3	416.3	354.9	388.4
Feb.	292.1	271.9	385.0	413.3	337.2	355.9
Mar.	298.2	281.1	374.3	397.3	320.6	330.2
Apr.	319.7	312.9	383.9	414.2	312.8	323.6
May	322.1	314.2	367.2	399.3	320.9	345.5
June	331.4	318.3	342.3	396.1	....	....
July	321.4	304.3	331.2	389.5	....	....
Aug.	336.9	311.2	337.6	396.0	....	....
Sept.	363.9	348.9	348.3	397.9	....	....
Oct.	361.3	346.1	354.4	398.0	....	....
Nov.	377.4	360.3	361.4	407.5	....	....
Dec.	392.2	368.9	373.6	412.1	....	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January, 1946, through May, 1947, will be shown later.

Wages — Average Weekly Earnings

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$46.71	$50.29	$54.03	$59.78	$57.33	$62.72
Feb.	46.05	49.21	54.06	59.90	54.70	58.22
Mar.	46.46	49.72	52.97	58.05	53.24	55.54
Apr.	49.67	54.77	55.23	61.64	53.44	56.54
May	49.82	54.72	55.30	61.12	55.72	61.15
June	50.45	54.82	55.49	61.35	....	....
July	50.60	56.11	55.74	62.06	....	....
Aug.	51.03	55.42	55.92	61.15	....	....
Sept.	53.69	59.89	57.76	64.75	....	....
Oct.	51.74	57.38	57.62	63.78	....	....
Nov.	52.93	58.87	57.99	64.86	....	....
Dec.	54.63	60.46	59.47	65.74	....	....

Wages — Average Hourly Earnings

	1946		1947		1948	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$1.121	$1.255	$1.330	$1.511	$1.444	$1.646
Feb.	1.129	1.266	1.331	1.517	1.421	1.613
Mar.	1.138	1.275	1.330	1.512	1.408	1.599
Apr.	1.232	1.414	1.397	1.608	1.413	1.603
May	1.266	1.446	1.416	1.622	1.435	1.636
June	1.283	1.461	1.419	1.615	....	....
July	1.292	1.472	1.445	1.640	....	....
Aug.	1.295	1.474	1.445	1.640	....	....
Sept.	1.323	1.507	1.447	1.661	....	....
Oct.	1.313	1.492	1.436	1.644	....	....
Nov.	1.322	1.503	1.453	1.661	....	....
Dec.	1.331	1.513	1.454	1.658	....	....

Hours — Average Weekly Hours per Worker

Month	1946	1947	1948	Month	1946	1947	1948
January	41.7	40.6	39.7	July	39.2	38.6	...
February	40.8	40.6	38.5	August	39.4	38.7	...
March	40.8	39.8	37.8	September	40.6	39.9	...
April	40.3	39.5	37.8	October	39.4	40.1	...
May	39.4	39.0	38.8	November	40.1	39.9	...
June	39.3	39.1	...	December	41.2	40.9	...

Source: U .S. Department of Commerce. Note: These figures are revised from time to time and the latest available issue should be consulted for the most accurate data.

Indexes of Production, Shipments and Inventory For The Rubber Industry

Production 1935-1939 = 100 (Based on man-hours)

Month	1946	1947	1948	Month	1946	1947	1948
Jan.	215	247	223	July	211	207	....
Feb.	216	246	215	Aug.	221	210	....
Mar.	221	239	205	Sept.	234	217	....
Apr.	219	234	200	Oct.	234	223	....
May	215	220	200	Nov.	243	225	....
June	218	216	200	Dec.	252	230	....

Shipments—Average Month 1939 = 100 (Based on $ Value)

Jan.	211	301	282	July	278	298	....
Feb.	214	326	289	Aug.	292	312	....
Mar.	223	332	285	Sept.	321	346	....
Apr.	291	320	312	Oct.	344	348	....
May	297	309	328	Nov.	324	354	....
June	302	322	342	Dec.	363	307	....

Inventory — Average Month 1939 = 100 (Based on $ Value)

Jan.	171	229	271	July	187	268	....
Feb.	177	241	283	Aug.	191	258	....
Mar.	183	253	294	Sept.	197	246	....
Apr.	190	270	293	Oct.	204	247	....
May	188	279	305	Nov.	207	242	....
June	185	277	287	Dec.	209	257	....

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1941	1942	1943	1944	1945	1946	1947
Asphalt [a]							
Short tons	20,536	22,263	16,510	20,189	19,483	28,715	.....
% of total	0.6	0.6	0.5	0.6	0.5	0.7	..
Barite (Barytes):							
Short tons	9,800	6,334	8,000	10,000	10,000	20,000	17,000
% of total	4.2	3.6	3.9	2.9	2.1	4.4	3.1
Carbon Black:							
Short tons	219,751	147,974	236,737	369,015	402,193	470,732	.....
% of total	68.2	65.8	75.2	78.7	78.9	74.1	..
Clay, Kaolin:							
Short tons	127,0555	51,334	50,964	59,588	109.936	162.393	166.201
% of total	11.6	5.1	5.5	6.8	11.7	12.3	12.0
Clay, Fire & Stoneware:							
Short tons	9,000	5,000	10,259	7,160	7,800	12,951	.....
% of total	0.2	0.1	0.2	0.1	0.1	0.2	..
Lead Sulfate, Basic:							
Short tons	200	89	131	268	200	.....	.....
% of total	1.9	1.1	2.3	4.2	5.2	..	..
Lime:							
Short tons	3,058	1,381	2,039	5.634	7,170	3,193	.....
% of total	0.05	0.02	0.05	0.13	0.10	0.1	..
Litharge:							
Short tons	3,968	3,460	4,302	3,023	1,864	2,131	.....
% of total	3.3	3.8	3.8	2.2	1.3	1.6	..
Lithopone:							
Short tons	3,547	1,047	1,078	726	977	1,607	3,085
% of total	2.0	0.8	0.8	0.5	0.7	1.1	1.1
Mica, Ground:							
Short tons	3,476	1,754	3,063	1,137	3,715	4,951	.....
% of total	8.0	3.7	6.0	2.2	7.0	8.0	..
Sulfur:							
Short tons	63,000	40,000	51,000	63,000	64,960	72,800	.....
% of tgotal	2.4	1.4	1.8	1.9	2.0	2.2	..
Talc [b]							
Short tons	58,114	40,487	48,994	51,833	63,758*	65,980	.....
% of tgotal	13.9	10.0	11.8	13.0	16.0	14.4	..
Zinc Oxide:							
Short tons	90,429	52,717	67,898	59,518	63,447	83,776	.....
% of total	63.4	53.0	47.4	42.3	49.6	53.1	..

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes pyrophyllite and ground soapstone. * Revised.

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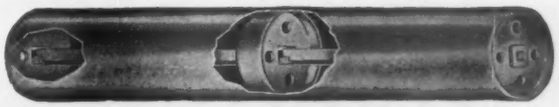

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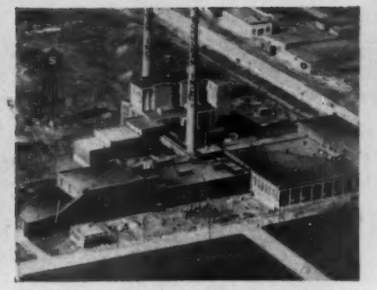

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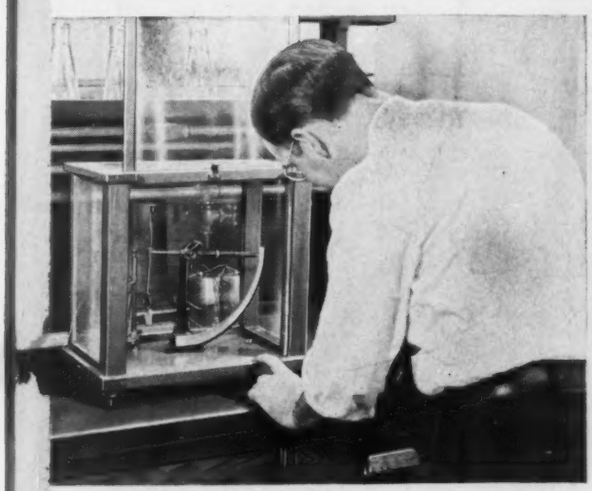

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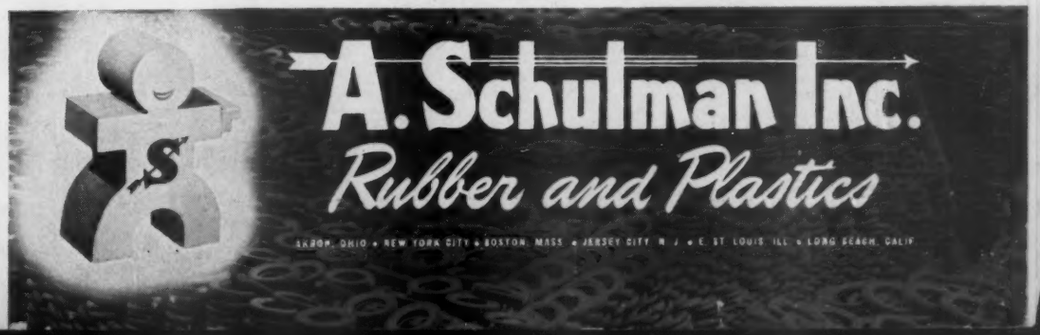

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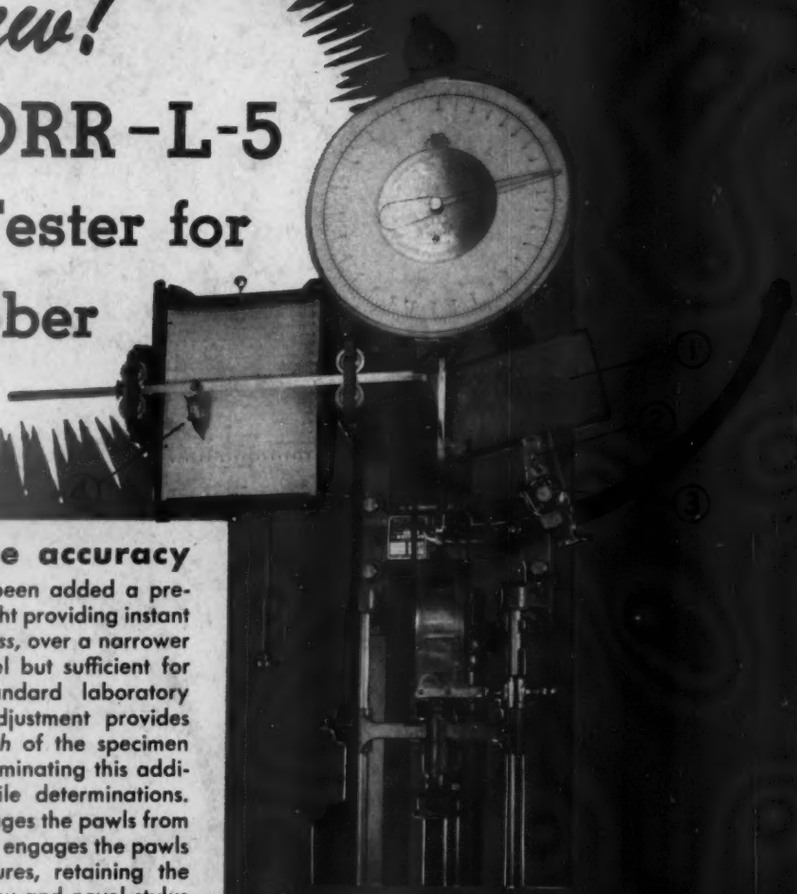

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